PTO/SB/61 (09-06)
Approved for use through 03/31/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

PETITION FOR REVIVAL OF AN APPLICATION FOR PATENT ABANDONED UNAVOIDABLY UNDER 37 CFR 1.137(a)

Docket Number (Optional): MP-226

First Named Inventor: Hubertus Murrenhoff
Art Unit:
Application Number: 10/527,204
Examiner:
Filed: March 10, 2005
Title: VALVE WITH INCREASED DYNAMIC RESPONSE

Attention: Office of Petitions
Mail Stop Petition
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

NOTE: If information or assistance is needed in completing this form, please contact Petitions Information at (571) 272-3282.

The above-identified application became abandoned for failure to file a timely and proper reply to a notice or action by the United States Patent and Trademark Office. The date of abandonment is the day after the expiration date of the period set for reply in the Office notice or action plus any extensions of time actually obtained.

APPLICANT HEREBY PETITIONS FOR REVIVAL OF THIS APPLICATION.

NOTE: A grantable petition requires the following items:
(1) Petition fee.
(2) Reply and/or issue fee.
(3) Terminal disclaimer with disclaimer fee – required for all utility and plant applications filed before June 8, 1995, and for all design applications; and
(4) Adequate showing of the cause of unavoidable delay.

1. Petition fee

☐ Small entity – fee $_____ (37 CFR 1.17(l)). Applicant claims small entity status. See 37 CFR 1.27.

☒ Other than small entity – fee $500.00 (37 CFR 1.17(l)).

2. Reply and/or fee

A The reply and/or fee to the above-noted Office action in the form of Combined Declaration and Power of Attorney (identify the type of reply):

☐ has been filed previously on _____.

☒ is enclosed herewith.

B The issue fee of $ _____

☐ has been filed previously on _____.

☐ is enclosed herewith.

10/23/2006 ATRAN1 00000129 10527204
01 FC:1452 500.00 OP

PTO/SB/61 (09-06)
Approved for use through 03/31/2007. OMB 0651-0031
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PETITION FOR REVIVAL OF AN APPLICATION FOR PATENT ABANDONED UNAVOIDABLY UNDER 37 CFR 1.137(a)

3. Terminal disclaimer with disclaimer fee

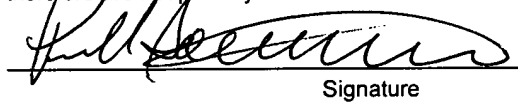
☐ Since this utility/plant application was filed on or after June 8, 1995, no terminal disclaimer is required.

☐ A terminal disclaimer (and disclaimer fee (37 CFR 1.20(d)) of $ _____ for a small entity or $ _____ for other than a small entity) disclaiming the required period of time is enclosed herewith (see PTO/SB/63).

4. An adequate showing of the cause of the delay, and that the entire delay in filing the required reply from the due date for the reply until the filing of a grantable petition under 37 CFR 1.137(a) was unavoidable, is enclosed.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.



Signature

October 12, 2006
Date

Peter K. Sommer, Esq.
Typed or printed name

26,587
Registration Number, if applicable

3400 HSBC Center
Address

(716) 847-8400
Telephone Number

Buffalo, New York 14203
Address

Enclosure ☐ Fee Payment

☐ Reply

☐ Terminal Disclaimer Form

☐ Additional sheets containing statements establishing unavoidable delay

☒ Declarations of Peter K. Sommer and Sharon A. Piatkowski

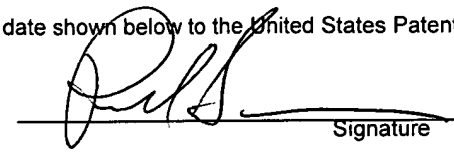
CERTIFICATE OF MAILING OR TRANSMISSION (37 CFR 1.8(a))

I hereby certify that this correspondence is being:

☒ deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to **Mail Stop Petition**, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

☐ transmitted by facsimile on the date shown below to the United States Patent and Trademark Office at (571) 273-8300.

October 12, 2006
Date



Signature

Peter K. Sommer
Typed or printed name of person signing certificate

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.: 10/527,204 Confirmation No. 2268

Applicant: Hubertus Murrenhoff *et al.*

Filed: March 10, 2005

Title: VALVE WITH INCREASED DYNAMIC RESPONSE

TC/A.U.:

Examiner:

Docket No.: MP-226

Cust. No.: 01342

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Declaration of Sharon A. Piatkowski

Sharon A. Piatkowski, being warned that willful false statements and the like so made are punishable by fine or imprisonment under 18 U.S.C. § 1001, declares and states:

1. I am employed by Phillips Lytle LLP, attorneys for applicants herein as the Paralegal of the Intellectual Property Group, and have been so employed in excess of twelve years.

2. This declaration is made in support of the accompanying Petition for Revival of the subject application for Patent Abandoned for Unavoidably Delay. I have personal knowledge of all facts and circumstances set forth herein, unless otherwise indicated.

3. I have read the accompanying Declaration of Peter K. Sommer, and make reference to the Exhibits attached to that Declaration.

4. I know the facts as recited in the Declaration of Peter K. Sommer to be true and correct, and do hereby corroborate them.

5. Sommer Declaration Exhibit A is a true and complete copy of the application mailed to the Patent and Trademark Office by Express Mail on March 10, 2005. I personally mailed this application to the USPTO.

6. Sommer Declaration Exhibit B is a true and complete copy of a letter that Mr. Sommer wrote to the Commissioner for Patents on July 29, 2005. My dictation initials are "pi", and I did send this letter to the Office.

7. I also prepared for Mr. Sommer, and did send to the Office, the signed copy of his letter dated November 2, 2005, (Sommer Declaration Exhibit C).

8. I did also prepare for Mr. Sommer, and did send to the Office, his letter dated May 10, 2006, (Sommer Declaration Exhibit D).

9. As part of my duties, I open all of the mail intended for the Intellectual Property Group at Phillips Lytle LLP. I am responsible for the docketing of matters as they come in from the USPTO. I am also responsible for sending such matters to the USPTO, so that I can docket that they have been sent.

10. To the best of my knowledge, we never received the official Filing Receipt in the subject application. Nor did we receive a "Notification of Missing Requirements" in this application, nor a Notification of Abandonment, until August 14, 2006, when copies of the "Notification of Abandonment" and "Notification of Missing Requirements" were received. I personally date stamped those two Notices with the date of receipt in the Intellectual Property Group.

11. In view of the foregoing, it appears that the application became abandoned unavoidably for the simple reason that we never received the Filing Receipt, the Notification to File Missing Requirements, or the Notice of Abandonment, until the latter two documents were received on August 14, 2006.

12. Accordingly, the accompanying Petition for Revival should be granted.

Sharon A. Piatkowski

Dated: October 12, 2006

Doc # 01-1608991.2

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.: 10/527,204 Confirmation No. 2268

Applicant: Hubertus Murrenhoff *et al.*

Filed: March 10, 2005

Title: VALVE WITH INCREASED DYNAMIC RESPONSE

TC/A.U.:

Examiner:

Docket No.: MP-226

Cust. No.: 01342

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Declaration of Peter K. Sommer

Peter K. Sommer, being warned that willful false statements and the like so made are punishable by fine or imprisonment under 18 U.S.C. § 1001, declares and states:

1. I am an attorney at law, and licensed to practice in the State of New York, and registered to practice before the United States Patent and Trademark Office under Reg. No. 26,587, and have been so employed for more than twelve years.

2. I am a partner in the law firm of Phillips Lytle LLP, attorneys for applicant herein, and the attorney principally in charge of execution of this application. I have personal knowledge of all facts and circumstances set forth herein, unless otherwise indicated.

3. This Declaration is submitted in support of Applicants' Petition for Revival of an Application for Patent Abandoned Unavoidably Under 37 C.F.R. 1.137(a).

4. On March 10, 2005, I directed the filing of a specification, claims and drawings with the USPTO. Attached as Exhibit A is a copy of the application as deposited with the United States Postal Service as Express Mail on March 10, 2005.

5. I am the immediate supervisor of Sharon A. Piatkowski, who is the Paralegal for the Intellectual Property Group of Phillips Lytle LLP. Ms. Piatkowski is in charge of all filings with the USPTO, and is in charge of docketing matters for the members of the Intellectual Property

Group. In this regard, Ms. Piatkowski normally receives all of the mail intended for the Intellectual Property Group at Phillips Lytle LLP, and opens it so that she may then docket matters as they are received.

6. In July of 2005, Ms. Piatkowski called to my attention the fact that we had not received a Filing Receipt and a Notice to Filing Missing Parts in the subject application.

7. On July 29, 2005, I wrote to the Office, to inquire as to the status of the application. A copy of my letter to the Office dated July 29, 2005 is attached as Exhibit B.

8. Thereafter, Ms. Piatkowski notified me that we had still not received the Filing Receipt and Notice to Filing Missing Parts in the subject application.

9. On November 2, 2005, I wrote a second letter to the Office inquiring as to the status of the subject application. A copy of my letter of November 2, 2005 is attached as Exhibit C.

10. Thereafter, Ms. Piatkowski advised me that we had still not received either the Filing Receipt, the Notice to File Missing Parts, or a response to either of my status inquiries.

11. Accordingly, on May 10, 2006, I again wrote to the Office to inquire as to the status of the subject application. A copy of my letter dated May 10, 2006 is attached as Exhibit D.

12. I did not receive any response to this letter.

13. On June 20, 2006, I spoke with an individual who identified himself as Terrance Till, who was working at the PCT Help Desk. He indicated that he would look into this matter and respond. I never received any further response from Mr. Till.

14. On June 30, 2006, I called the PCT Help Desk, and spoke with a woman but did not record her name. However, she reported to me that the file was with a contractor employed by the Office. She advised me to wait until I received further notice from the Office to avoid having things cross in the mail.

15. On August 11, 2006, I again called the PCT Help Desk, and spoke with a Mr. Shakeel Ahmed. I inquired of him as to the status of this application. He looked into the file, and advised me that the application was abandoned for failure to file a response to the Notice to File Missing Parts. When I explained to Mr. Ahmed that we had never received either the Filing Receipt, the Notice to File Missing Parts, or a Notification of Abandonment. Mr. Ahmed agreed to mail me a copy of the Notification of Abandonment.

16. On August 14, 2006, the Intellectual Property Group at Phillips Lytle received the copy of the Notification of Abandonment dated August 8, 2006, together with a copy of the "Notification of Missing Requirements" indicated it had been previously mailed on August 16, 2005. To the best of my knowledge, we never received the Filing Receipt of this application.

17. OurReceipt on August 14, 2006 of the Notification of Abandonment mailed August 8, 2006, was the first formal written notice that we had received indicating that the subject application was abandoned.

18. The address of our firm is, and has been during all times in question, the address indicated on the Notification of Abandonment. We are registered with the Office as Customer No. 01342, and our address has been correct during all times in question. Hence, any correspondence that was addressed to us should have been received by us.

19. To the best of my knowledge and belief, we never received the official Filing Receipt in this application. Nor did we receive the "Notification of Missing Requirements" dated August 16, 2005 or the Notification of Abandonment dated August 8, 2006, until copies of these documents were received by us on August 14, 2006, this being the date of receipt of the copies mailed by Mr. Ahmed.

20. The present Petition is filed within three months of the date of the Notification of Abandonment, and within one year of formal abandonment of the application.

21. In view of the foregoing, the Petition for Revival of the subject application should be granted.

Peter K. Sommer

Dated: October 12, 2006

Doc # 01-1608991.1

INVENTOR: urrenhoff et al. (Moog Gmb
SERIAL NO.:
FILED:
TITLE: VALVE WITH INCREASED DYNAMIC RESPONSE

Transmittal letter into US National Stage, International Application, translation into English, amended claims, ~~International Search Report, Request,~~ Chapter II Demand and our check for $950.00

AMENDMENT IN ABOVE APPLICATION HAS BEEN RECEIVED.

10/527204

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58188	03/08/05 03001 70001	MOOG - US PAYMENT OF FILING FEE FOR U.S. NATIONAL STAGE CORRESPONDING TO PCT/EP03/08550 (VALVE WITH INCREASED DYNAMIC RESPONSE)	950.00

PETER K. SOMMER 950.00

LASER CHECK (800) 826-1988 ↙ DETACH ALONG PERFORATION ↘ GL 11-C-54 LC 102

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BUFFALO, NY 14203
10-2/220 750

№ 110986

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CLIENT DISBURSEMENT ACCOUNT
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BUFFALO, NY 14203

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AUTHORIZED SIGNATURE

⑈110986⑈ ⑆022000020⑆ 750⑈77031⑈7⑈

Practitioner's Docket No. Moog GmbH - Murrenhoff et al. ***PATENT***

Preliminary Classification:

Proposed Class:

Subclass:

NOTE: "All applicants are requested to include a preliminary classification on newly filed patent applications. The preliminary classification, preferably class and subclass designations, should be identified in the upper right-hand corner of the letter of transmittal accompanying the application papers, for example 'Proposed Class 2, subclass 129.'" M.P.E.P. § 601, 7th ed.

TRANSMITTAL LETTER TO THE U.S. DESIGNATED OFFICE (DO/US)— ENTRY INTO THE U.S. NATIONAL STAGE UNDER CHAPTER I

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP03/08550	01/08/2003	11/09/2002

TITLE OF INVENTION

VALVE WITH INCREASED DYNAMIC RESPONSE

APPLICANT(S)

Hubertus Murrenhoff and Christoph Boes

Mail Stop PCT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

EXPRESS MAILING UNDER 37 C.F.R. § 1.10*
(Express Mail label number is mandatory.)
(Express Mail certification is optional.)

I hereby certify that this paper, along with any document referred to, is being deposited with the United States Postal Service on this date March 10, 2005, in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 as "Express Mail Post Office to Addressee" Mailing Label No. EV399461406US

Peter K. Sommer, Reg. No. 26,587
(type or print name of person mailing paper)

Signature of person certifying

WARNING: *Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.*

***WARNING:** Each paper or fee filed by "Express Mail" must have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C.F.R. 1.10(b).*
"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will not be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.

NOTE: The time period for commencement of the national stage in the U.S. does not depend upon whether a Demand under PCT Article 31 has been filed. It is no longer necessary to provide separately for the time period for filing the documents and fees required by 35 U.S.C. 371(c) for an: (1) application in which a Demand under Article 31 has not been filed within nineteen months form the priority date and (2) applications in which a Demand under Article 31 has been filed within nineteen months from the priority date.

NOTE: The completion of those filing requirements that can be made at a time later than 20 months from the priority date results from the Commissioner exercising his judgment under the authority granted under 35 U.S.C. § 371(d). The filing receipt will show the actual date of receipt of the last item completing the entry into the national phase. See 37 C.F.R. § 1.491(b), which states: "An international application enters the national stage when the applicant has filed the documents and fees required by 35 USC 371(c) within the periods set forth in § 1.495."

WARNING: *Where the items are those that can be submitted to complete the entry of the international application into the national phase, the application is still considered to be in the international stage. And if mailing procedures are utilized to obtain a date the express mail procedure of 37 C.F.R. § 1.10 must be used (because international application papers are not covered by an ordinary certificate of mailing. 37 C.F.R. § 1.8(2)(xi)).*

WARNING: *Documents and fees must be clearly identified as a submission to enter the national stage under 35 U.S.C. § 371, otherwise the submission will be considered as being made under 35 U.S.C. § 111. 37 C.F.R. § 1.494(g).*

WARNING: *Abandonment is governed by 37 C.F.R. § 1.495 as follows:*

37 C.F.R. § 1.495

(h) An international application becomes abandoned as to the United States thirty months from the priority date if the requirements of paragraph (b) of this section have not been complied with within thirty months form the priority date. If the requirements of paragraph (b) of this section are complied with within thirty months from the priority date but either of any required translation of the international application as filed or the oath or declaration are not timely filed, an international application will become abandoned as to the United States upon expiration of the time period pursuant to paragraph (c) of this section.

37 C.F.R. § 1.495

(b) To avoid abandonment of the application, the applicant shall furnish to the United States Patent and Trademark Office not later than the expiration of thirty months from the priority date:

(1) A copy of the international application, unless it has been previously communicated by the International Bureau or unless it was originally filed in the United States Patent and Trademark Office; and

(2) The basic national fee (see § 1.492(a)).

1. Applicant herewith submits to the United States Designated Office (DO/US) the following items under 35 U.S.C. § 371:

a. ☑ This express request to immediately begin national examination procedures (35 U.S.C. § 371(f)).

b. ☒ The U.S. National Fee (35 U.S.C. § 371(c)(1)) and

☐ other fees (37 C.F.R. § 1.492), as indicated below:

2. Fees

CLAIMS FEE	(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) CALCULATIONS
☐*	TOTAL CLAIMS	9 —20=	-0-	x$ 18.00=	$ -0-
	INDEPENDENT CLAIMS	1 —3=	-0-	x$ 88.00=	-0-
	MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ $300.00	
BASIC FEE**	The international search fee, as set forth in § 1.445(a)(2) to be paid to the US PTO acting as an International Searching Authority: ☐ has been paid (37 CFR 1.492(a)(2)) ..... $790.00 ☐ has not been paid (37 CFR 1.492(a)(3)) ..... $1110.00 ☒ where a search report on the international application has been prepared by the European Patent Office or the Japanese Patent Office (37 CFR 1.492(a)(5)) $950.00				950.00
	Total of above Calculations				= 950.00
SMALL ENTITY	Reduction by ½ for filing by small entity, if applicable. Assertion must be be made. (note 37 CFR 1.27)				-
	Subtotal				
	Total National Fee				$ 950.00
	Fee for recording the enclosed assignment document $40.00 (37 CFR 1.21(h)). (See item 10 below). See attached "ASSIGNMENT COVER SHEET (37 C.F.R. § 3.34)".				
TOTAL	Total Fees enclosed				$ 950.00

*See attached Preliminary Amendment Reducing the Number of Claims.

**WARNING: *"To avoid abandonment of the application, the applicant shall furnish to the United States Patent and Trademark Office not later than the expiration of thirty months from the priority date: * * * (2) the basic national fee (see § 1.492(a))." 37 C.F.R. § 1.495(b).*

☐ **Assertion of Small Entity Status**

☐ **Applicant hereby asserts status as a small entity under 37 C.F.R. § 1.27.**

☐ Written Assertion Statement Attached

☐ Fee Payment(s) herewith

NOTE: 37 C.F.R. § 1.27(c) deals with the assertion of small entity status, whether by a written specific declaration thereof or by payment as a small entity of the basic filing fee or the fee for the entry into the national phase as states:

"(c) Assertion of small entity status. Any party (person, small business concern or nonprofit organization) should make a determination, pursuant to paragraph (f) of this section, of entitlement to be accorded small entity status based on the definitions set forth in paragraph (a) of this section, and must, in order to establish small entity status for the purpose of paying small entity fees, actually make an assertion of entitlement to small entity status, in the manner set forth in paragraphs (c)(1) or (c)(3) of this section, in the application or patent in which such small entity fees are to be paid.

(1) Assertion by writing. Small entity status may be established by a written assertion of entitlement to small entity status. A written assertion must:

(i) Be clearly identifiable;

(ii) Be signed (see paragraph (c)(2) of this section); and

(iii) Convey the concept of entitlement to small entity status, such as by stating that applicant is a small entity, or that small entity status is entitled to be asserted for the application or patent. While no specific words or wording are required to assert small entity status, the intent to assert small entity status must be clearly indicated in order to comply with the assertion requirement.

(2) Parties who can sign and file the written assertion. The written assertion can be signed by:

(i) One of the parties identified in §§ 1.33(b) (e.g., an attorney or agent registered with the Office), §§ 3.73(b) of this chapter notwithstanding, who can also file the written assertion;

(ii) At least one of the individuals identified as an inventor (even though a §§ 1.63 executed oath or declaration has not been submitted), notwithstanding §§ 1.33(b)(4), who can also file the written assertion pursuant to the exception under §§ 1.33(b) of this part; or

(iii) An assignee of an undivided part interest, notwithstanding §§ 1.33(b)(3) and 3.73(b) of this chapter, but the partial assignee cannot file the assertion without resort to a party identified under §§ 1.33(b) of this part.

(3) Assertion by payment of the small entity basic filing or basic national fee. The payment, by any party, of the exact amount of one of the small entity basic filing fees set forth in §§ 1.16(a), (f), (g), (h), or (k), or one of the small entity basic national fees set forth in §§ 1.492(a)(1), (a)(2), (a)(3), (a)(4), or (a)(5), will be treated as a written assertion of entitlement to small entity status even if the type of basic filing or basic national fee is inadvertently selected in error.

(i) If the Office accords small entity status based on payment of a small entity basic filing or basic national fee under paragraph (c)(3) of this section that is not applicable to that application, any balance of the small entity fee that is applicable to that application will be due along with the appropriate surcharge set forth in §§ 1.16(e), or §§ 1.16(l).

(ii) The payment of any small entity fee other than those set forth in paragraph (c)(3) of this section (whether in the exact fee amount or not) will not be treated as a written assertion of entitlement to small entity status and will not be sufficient to establish small entity status in an application or a patent."

☒ Attached is a ☒ check ☐ money order in the amount of $ 950.00

☐ Authorization is hereby made to charge the amount of $ _____

☒ to Deposit Account No. 19-3320

☐ to Credit card as shown on the attached credit card information authorization form PTO-2038.

WARNING: *Credit card information should not be included on this form as it may become public.*

☐ Charge any additional fees required by this paper or credit any overpayment in the manner authorized above.

A duplicate of this paper is attached.

WARNING: *If the translations of the international application and/or the oath or declaration have not been submitted by the applicant within thirty (30) months from the priority date, the applicant will be so notified and given a period of time within which to file the translation and/or oath or declaration in order to prevent abandonment. 37 C.F.R. § 1.495(c). The payment of the surcharge set forth in § 1.492(e) is required as a condition for accepting the oath or declaration later than thirty (30) months after the priority date. The payment of the processing fee set forth in § 1.492(f) is required for acceptance of an English translation later than thirty (30) months after the priority date. Failure to comply with these requirements will result in abandonment of the application.*

3. A copy of the International application as filed (35 U.S.C. § 371(c)(2)):

a. ☒ is transmitted herewith.

b. ☐ is not required, as the application was filed with the United States Receiving Office.

c. ☐ has been transmitted

i. ☐ by the International Bureau. Date of mailing of the application (from form PCT/IB/308): _____.

ii. ☐ by applicant on _____. *(Date)*

NOTE: Section 1.495(b)(1) requires that the basic national fee and a copy of the international application must be filed with the Office by thirty (30) months from the priority date to avoid abandonment. "The International Bureau normally provides the copy of the international application to the Office in accordance with PCT Article 20. At the same time, the International Bureau notifies the applicant of the communication to the Office. In accordance with PCT Rule 47.1, that notice shall be accepted by all designated offices as conclusive evidence that the communication has duly taken place. Thus, if the applicant desires to enter the national stage and applicant has received notice from the International Bureau, applicant need only pay the basic national fee by 30 months from the priority date." Notice of Jan. 7, 1993, 1147 O.G. 29 to 40, at 35.

4. ☒ A translation of the International application into the English language (35 U.S.C. § 371(c)(2)):

a. ☒ is transmitted herewith.

b. ☐ is not required as the application was filed in English.

c. ☐ was previously transmitted by applicant on _____. *(Date)*

NOTE: 37 C.F.R. § 1.495(c): "If applicant complies with paragraph (b) of this section before expiration of thirty months from the priority date but omits . . . a translation of the international application, as filed, into the English language, if it was originally filed in another language (35 U.S.C. 371(c)(2)) . . . applicant will be so notified and given a period of time within which to file the translation . . . in order to prevent abandonment of the application. The payment of the processing fee set forth in § 1.492(f) is required for acceptance of an English translation later than the expiration of thirty months after the priority date. . . . A 'Sequence Listing' need not be translated if the 'Sequence Listing' complies with PCT Rule 12.1(d) and the description complies with PCT Rule 5.2(b)"

5. ☒ Amendments to the claims of the International application under PCT Article 19 (35 U.S.C. § 371(c)(3)):

NOTE: 37 C.F.R. § 1.495(d): "A copy of any amendments to the claims made under PCT Article 19, and a translation of those amendments into English, if they were made in another language, must be furnished not later than the expiration of thirty months from the priority date. Amendments under PCT Article 19 which are not received by the expiration of thirty months from the priority date will be considered to be canceled."

NOTE: The Notice of January 7, 1993, dealing with the prior practice, indicated that 37 C.F.R. § 1.494(d) [now deleted] was "amended to clarify the existing practice that PCT Article 19 Amendments must be submitted by 20 months from the priority date, which time may not be extended." This Notice further advises: "Of course, the failure to do so does not result in loss of the subject matter of PCT Article 19 amendments. The applicant may submit that subject matter in a preliminary amendment filed under Section 1.121. In many cases, filing an amendment under Section 1.121 is preferable since grammatical or idiomatic errors may be corrected." 1147 O.G. 29-40, at 35. See item 11(c) below.

a. ☒ are transmitted herewith.

b. ☐ have been transmitted

i. ☐ by the International Bureau. Date of mailing of the amendment (from form PCT/IB/308): _____.

ii. ☐ by applicant on _____ *(Date)*

c. ☐ have not been transmitted, as

i. ☐ no notification has been received that the International Search Authority has received the Search Copy.

ii. ☐ the Search Copy was received by the International Searching Authority, but the Search Report has not yet been issued. Date of receipt of Search Copy (from form PCT/ISA/202): _____.

iii. ☐ applicant chose not to make amendments under PCT Article 19. Date of mailing of Search Report (from form PCT/ISA/210): _____.

iv. ☐ the time limit for the submission of amendments has not yet expired. The amendments, or a statement that amendments have not been made, will be transmitted before the expiration of the time limit under PCT Rule 46.1.

6. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. § 371(c)(3)):

a. ☐ is transmitted herewith.

b. ☐ is not required as the amendments were made in the English language.

c. ☐ has not been transmitted for reasons indicated at point 5(c) above.

7. ☒ An oath or declaration of the inventor, including power of attorney, (35 U.S.C. § 371(c)(4)) complying with 35 U.S.C. § 115

a. ☐ was previously submitted by applicant on _____ *(Date)*

b. ☐ is submitted herewith, and such oath or declaration

i. ☐ is attached to the application.

ii. ☐ identifies the application and any amendments under PCT Article 19 that were transmitted as stated in points 3(b) or (c) and 5(b); and states that they were reviewed by the inventor, as required by 37 C.F.R. § 1.70.

iii. ☒ will follow.

NOTE: 37 C.F.R. § 1.495(c): "If applicant complies with paragraph (b) of this section before expiration of thirty months from the priority date but omits . . . the oath or declaration of the inventor (35 U.S.C. 371(c)(4) and § 1.497), if a declaration of inventorship in compliance with § 1.497 has not been previously submitted in the international application under PCT Rule 4.17(iv) within the time limits provided for in PCT Rule 26ter.1, applicant will be so notified and given a period of time within which to file the . . . oath or declaration in order to prevent abandonment of the application. . . . The payment of the surcharge set forth in § 1.492(e) is required for acceptance of the oath or declaration of the inventor later than the expiration of thirty months after the priority date."

Other document(s) or information included:

8. ☒ An International Search Report or Declaration under PCT Article 17(2)(a):
   - a. ☒ is transmitted herewith.
   - b. ☐ has been transmitted by the International Bureau. Date of mailing (from form PCT/IB/308): _____.
   - c. ☐ is not required, as the application was searched by the United States International Searching Authority.
   - d. ☐ will be transmitted promptly upon request.
   - e. ☐ has been submitted by applicant on _____ (*Date*)
   - f. ☐ is not transmitted, as the international search has not yet issued.

9. ☐ An Information Disclosure Statement under 37 C.F.R. §§ 1.97 and 1.98:

WARNING: *1893.03(g) Information Disclosure Statement in a National Stage Application*

"When an international application is filed under the Patent Cooperation Treaty (PCT), prior art documents may be cited by the examiner in the international search report and/or the international preliminary examination report. When a national stage application is filed under 35 U.S.C. 371, or a national application is filed under 35 U.S.C. 111 claiming benefit of the filing date of the international application, it is often desirable to have the examiner consider the documents cited in the international application when examining the national application.

"As a result of an agreement among the European Patent Office (EPO), Japanese Patent Office (JPO), and the United States Patent and Trademark Office (USPTO), copies of documents cited in the international search report issued by any one of these International Searching Authority Offices generally are being sent to the other Offices when designated in the international application. Accordingly, in many national stage applications where the international search was conducted by the EPO, JPO, or USPTO, copies of the documents cited in the international search report are made available to the examiner in the national stage application.

"When all the requirements for a national stage application have been completed, applicant is notified (Form PCT/DO/EO/903) of the acceptance of the application under 35 U.S.C. 371, including an itemized list of the items received. The itemized list includes an indication of whether a copy of the international search report and copies of the references cited therein are present in the national stage file. The examiner will consider the documents cited in the international search report, without any further action by applicant under 37 CFR 1.97 and 1.98, when both the international search report and copies of the documents are indicated to be present in the national stage file. The examiner will note the consideration in the first Office action. There is no requirement that the examiners list the documents on a PTO-892 form. See form paragraphs 6.53, 6.54, and 6.55 (reproduced in MPEP § 609). Otherwise, applicant must follow the procedure set forth in 37 CFR 1.97 and 1.98 in order to ensure that the examiner considers the documents cited in the international search report.

"This practice applies only to documents cited in the international search report relative to a national stage application filed under 35 U.S.C. 371. It does not apply to documents cited in an international preliminary examination report that are not cited in the search report. It does not apply to applications filed under 35 U.S.C. 111(a) claiming the benefit of an international application filing date."

a. ☐ is transmitted herewith.

Also transmitted herewith is (are)

☐ Form PTO—1449 (PTO/SB/08A and 08B)

☐ Copies of citations listed

b. ☐ will be transmitted within THREE MONTHS of the date of submission of requirements under 35 U.S.C. § 371(c).

NOTE: 37 C.F.R. § 1.97

"(b) An information disclosure statement shall be considered by the Office if filed by the applicant within any one of the following time periods:

• • •

(2) Within three months of the date of entry of the national stage as set forth in § 1.491 in an international application.

c. ☐ was previously submitted by applicant on _____ *(Date)*

10. ☐ An assignment document is transmitted herewith for recording. A separate

☐ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or

☐ FORM PTO—1595

is also attached.

☐ Please mail the recorded assignment document to:

i. ☐ the person whose signature and address appears below.

ii. ☐ the following:

11. ☒ Additional documents

a. ☒ Copy of request (PCT/RO/101)

b. ☒ International Publication No. WO2004/033921

i. ☒ Specification, claims and drawing

ii. ☐ Front page only

c. ☐ Preliminary amendment (37 C.F.R. § 1.121)

d. ☐ Other

12. ☐ The above checked items are being transmitted

a. ☐ before the 18th month publication.

b. ☐ after publication and the article 20 communication, but before 20 months from the priority date.

c. ☐ after 20 months (revival).

NOTE: Petition to revive (37 C.F.R. § 1.137(a) or (b)) is necessary if 35 U.S.C. § 371 requirements are submitted after 20 months.

13. ☐ Certain requirements under 35 U.S.C. § 371 were previously submitted by the applicant on _____ *(Date)* namely:

AUTHORIZATION TO CHARGE ADDITIONAL FEES

WARNING: *Accurately count claims, especially multiple dependant claims, to avoid unexpected high charges if extra claims are authorized.*

NOTE: "A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 C.F.R. § 1.136(a)(3).

NOTE: "Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 C.F.R. § 1.26(a).

NOTE: The previous practice of holding applications abandoned if an authorization to charge fees under 37 C.F.R. § 1.16 has been provided instead of an authorization to charge fees under 37 C.F.R. § 1.492 has been changed. The Office amended 37 C.F.R. § 1.25(b), effective November 7, 2000, so that an authorization to charge fees under 37 C.F.R. § 1.16 in an international application entering the national stage under 35 U.S.C. § 371 is now accepted by the Office as an authorization to charge fees under 37 C.F.R. § 1.492.

☐ Please charge, in the manner authorized above, the following additional fees that may be required by this paper and during the entire pendency of this application:

☐ 37 C.F.R. § 1.492(a)(1), (2), (3), and (4) (filing fees)

WARNING: *Because failure to pay the national fee within 20 months without extension (37 C.F.R. § 1.494(b)(2)), results in abandonment of the application, it would be best to always check the above box.*

☐ 37 C.F.R. § 1.492(b), (c), and (d) (presentation of extra claims)

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment, prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 C.F.R. § 1.16(d)), it might be best not to authorize the PTO to charge additional claim fees, except possibly when dealing with amendments after final action.

☐ 37 C.F.R. § 1.17 (application processing fees)

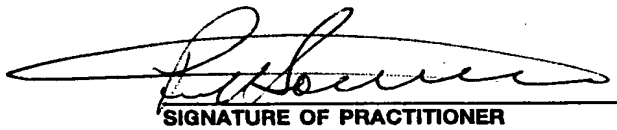
☐ 37 C.F.R. § 1.17(a)(1)–(5) (extension fees pursuant to § 1.136(a)).

☐ 37 C.F.R. § 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. § 1.311(b)).

*NOTE: Section 1.311(b) provides that an authorization to charge the issue fee (§ 1.18) to a deposit account may be filed in an individual application **only after the mailing of the notice of allowance.** Accordingly, general authorizations to pay fees and specific authorizations to pay the issue fee that are filed prior to the mailing of a notice of allowance will generally not be treated as requesting payment of the issue fee and will not be given effect to act as a reply to the notice of allowance. Applicant, when paying the issue fee, should submit a new authorization to charge fees, such as by completing box 6b on the current PTOL-85B form. Where no reply to the notice of allowance is received, the application will stand abandoned notwithstanding the presence of general authorizations to pay fees or a specific authorization to pay the issue fee that were submitted prior to mailing of the notice of allowance. Where an attempt is made to pay the issue fee but an incorrect amount is submitted, § 1.311(b)(1), or where the Office's issue fee transmittal form (currently PTOL-85(B)) is completed by applicant and submitted, § 1.311(b)(2), in reply to a notice of allowance, an exception will be made. Such submissions will operate as a request to charge the issue fee to any deposit account identified in a previously filed (i.e., submitted prior to the mailing of the notice of allowance) authorization to charge fees, and will be allowed to act as payment of the correct issue fee. § 1.311(b). See also the change to § 1.26(b). Notice of September 8, 2000, Fed. Reg. 54603-54683, at 54646 and 54647.*

NOTE: 37 C.F.R. § 1.28(b) requires "Notification of any change in status resulting in loss of entitlement to small entity status must be filed in the application . . . prior to paying or at the time of paying . . . issue fee. . .." From the wording of 37 C.F.R. § 1.28(b): (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

☐ 37 C.F.R. § 1.492(e) and (f) (surcharge fees for filing the declaration and/or filing an English translation of an International Application later than 20 months after the priority date.



SIGNATURE OF PRACTITIONER

Reg. No.: 26,587

Peter K. Sommer
(type or print name of practitioner)

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VALVE WITH INCREASED DYNAMIC RESPONSE

Technical Field

The present invention relates generally to the field of valves having relatively-movable spools and bushings to vary the size of control openings that are used to vary a fluid parameter (*e.g.*, flow, pressure, etc.), and, more particularly, to improved valves, particularly for use in servosystems, having bushings and spools that may be moved simultaneously in opposite directions to increase the dynamic response of the valve.

Background Art

High dynamic response valves are known in the art. These valves are often used, in both open and closed servoloops, to control fluid flows and/or fluid pressures in hydraulic systems. These systems may have a bushing movable relative to a body, and a valve spool movable relative to the bushing. The bushing and spool have control edges that are movable relative to one another to vary the sizes of one or more control openings by means of which the fluid parameter is controlled. Heretofore, one of the spool and bushing has been movable relative to the other by means of a direct or indirect drive.

Directly-controlled valves have used electromechanical transformers, proportional magnets, linear motors, plunger coils or piezoelectric converters to move the associated valve member (i.e., either spool or bushing) relative to the body. Directly-controlled valves have the disadvantage that fast reactions can only be realized with short-stroke drivers. Indirectly-controlled valves have used mechanical-hydraulic transformers, pressure-control of spool position, nozzle baffles and nozzle pipes. Highly-dynamic valves have used both direct and servo-assisted control.

In the prior art, either the position of the spool or the bushing relative to the body was varied. Thus, the prior art devices had an active (*i.e.*, movable) control edge and an inactive (*i.e.*, non-movable) control edge. If the spool was movable relative to the bushing, the active edge was on the spool, and the inactive edge was on the bushing. Conversely, if the bushing was movable relative to the spool, then the active edge was on the bushing and the inactive edge was on the spool. The attainable frequency of the valve was determined by the frequency response of the associated valve driver.

Accordingly, it would be generally desirable to provide an improved valve of this

spool-bushing type that is capable of improved dynamic response.

Disclosure of the Invention

With parenthetical reference to the corresponding parts, portions or surfaces of the disclosed embodiment, merely for purposes of illustration and not by way of limitation, the present invention broadly provides an improved valve having an increased dynamic response capability.

The improved valve (1) broadly includes: a body (2); a bushing (3) slidably mounted on the body; a valve spool (4) slidably mounted on the bushing; the bushing and spool having respective control edges (5) that are adapted to cooperate with one another as a function of the relative position between the bushing and spool to vary the size of a control opening therebetween; a first drive (11) operatively arranged to controllably move one of the bushing and spool relative to the body; and a second drive (12) operatively arranged to controllably move the other of the bushing and spool relative to the body; whereby the first and second drives may be selectively operated to move the bushing and spool simultaneously in opposite directions to increase the dynamic response of the valve.

The first drive may include a piezoelectric element (13) or a plunger coil.

The valve may further include a spool position sensing device (6), such as an eddy current sensor (7) or the like, for sensing the position of the spool relative to the bushing.

The valve may further include a bushing position sensing device (8), such as an eddy current sensor, a Hall effect sensor (9), a linear variable displacement transducer, or the like, for sensing the position of the bushing relative to the body.

The first drive may be operatively arranged to control the position of the bushing relative to the body, and wherein the second drive may be operatively arranged to control the position of the spool relative to the bushing.

One of the first and second drives may have a dynamic response greater than the other of the first and second drives.

One of the first and second drives may have a stroke that is greater than that of the other of the first and second drives.

This is achieved in that the valve spool and also the bushing are embodied such that they are oppositely slidable to one another at the same time

The distances to be covered by the spool and/or bushing during a control move-

ment can therefore be smaller. The times taken from one control state to the next are shorter. High dynamic control of the valve is therefore possible. Also, readily obtainable off-the-shelf standard components can be used in a valve according to the invention. This simplifies the procurement of the individual elements for assembly.

It is advantageous if the valve comprises a spool position sensor (7) for determining the spool position relative to the bushing position. In this type of valve, it is possible to determine the exact position of the spool with respect to the bushing and to actuate the valve accordingly. The bushing position determining device (8) may be a non-contacting eddy current sensor, which operates without wear and is rugged. Also it is extremely resistant to corrosion, and service life of the valve is increased.

In another embodiment, the valve includes a bushing position sensor (8) for determining the position of the bushing relative to the body. This facilitates the avoidance of drift of the bushing and spool in the main body. Consequently, trouble-free functioning of the valve is enabled also over a lengthy period of use. Knowledge of the absolute bushing position relative to the body is necessary if the spool and bushing are servo-assisted.

It is also advantageous if the bushing position determining device comprises an eddy current sensor, a Hall effect sensor or an inductive displacement transducer, such as a linear variable differential transformer (LVDT), or the like. Since possibly the exploitation of the property that a movement of electrons in the magnetic field is influenced and a thereby ensuing deflection can be acquired as a voltage on the Hall effect sensor, this has the advantage that very large magnetic fields can be measured and the measurement range of Hall effect sensors is noticeably larger than those of other sensors. The use of known measurement sensors in the spool position determining device, or in the bushing position determining device, is advantageous in this variant, because costs and effort in the procurement of the appropriate sensors can be avoided.

If the valve comprises a primary drive device and/or a high frequency drive device, then in this variant it is advantageous if both the bushing and the spool are movable. Also, it is possible to combine the two different drive device principles (*e.g.*, by providing a primary drive device and a high frequency drive device).

In one form, the primary drive device comprises at least one pilot valve influenc-

ing the movement of the bushing or the spool, then the application of a wear-free and rugged standard component is advantageously taken up.

In another embodiment, a first actuator valve is used to control movement of the bushing, and a second actuator is used to control movement of the spool. Rugged and particularly small and compact elements are then used for the spool and the bushing on the drive side.

In one variant it is also advantageous if the valve at least comprises a high frequency drive device. A high frequency drive device has the significant advantage that it has very short response times.

If the high frequency drive device comprises a piezoelement or a plunger coil, small dimensions of the high frequency drive devices are possible. Small installation spaces are desirable.

It is also advantageous in a variant if the high frequency drive device controls at least a displacement of the bushing. Consequently, the response time of the bushing is minimized during the control.

In a further embodiment, it is advantageous if the high frequency drive device exhibits a high inherent dynamic response and a low stroke, and the primary drive device exhibits a low inherent dynamic response and a large stroke. Since the high frequency drive device effectively complements the primary drive device in terms of inherent dynamic response and servo gain, particularly fast control times are possible. The combination of a highly dynamic response/short stroke and medium (low) dynamic response/long stroke leads to high servo gain.

If the high frequency drive device exhibits a low inherent dynamic response and a large stroke, and the primary drive device exhibits a high inherent dynamic response and a low stroke, then, in another form, an exchange of high frequency drive device elements with primary drive device elements is possible. The advantage of a particularly fast control of the individual components of the valve is however ensured.

Accordingly, the general object of the invention is to provide a valve having an improved dynamic response capability.

Another object is to provide a valve having a bushing mounted for movement relative to a body, and having a valve spool mounted for movement relative to the bush-

ing, with the bushing and spool being movable simultaneously to vary the relative positions of control edges on the bushing and spool.

These and other objects and advantages will become apparent from the foregoing and ongoing written specification, the drawing, and the appended claims.

Brief Description of the Drawings

Fig. 1 is a fragmentary longitudinal vertical cross-section through one form of the improved valve.

Description of the Preferred Embodiments

At the outset, it should be clearly understood that like reference numerals are intended to identify the same structural elements, portions or surfaces consistently throughout the several drawing figures, as such elements, portions or surfaces may be further described or explained by the entire written specification, of which this detailed description is an integral part. Unless otherwise indicated, the drawings are intended to be read (*e.g.*, cross-hatching, arrangement of parts, proportion, degree, etc.) together with the specification, and are to be considered a portion of the entire written description of this invention. As used in the following description, the terms "horizontal", "vertical", "left", "right", "up" and "down", as well as adjectival and adverbial derivatives thereof (*e.g.*, "horizontally", "rightwardly", "upwardly", etc.), simply refer to the orientation of the illustrated structure as the particular drawing figure faces the reader. Similarly, the terms "inwardly" and "outwardly" generally refer to the orientation of a surface relative to its axis of elongation, or axis of rotation, as appropriate.

In Fig. 1, the valve 1 is shown in longitudinal cross-section. The valve 1 comprises a main body 2 in which a bushing 3 is movably mounted. The bushing 3 has control edges 5 on its inner surface. The control edges 5 are formed in the interior of the bushing 3. A spool 4, with control edges 5 formed on its outer surface, is mounted for sliding movement within the bushing 3.

Through-openings 14 pass through the bushing 3. The through-openings 14 are connected with through-openings 14 in the main body 2.

The bushing 3 is constructed for movement using a high frequency drive device 11 in this embodiment. The high frequency drive device 11 can be selectively actuated to slide the bushing 3 in one direction. The high frequency drive device 11 comprises the

piezoelement 13. The piezoelement 13 has the advantage of a very fast response and pushes the bushing 3 in one direction. A return movement is provided by a spring 20.

In this embodiment, the spool 4 can be moved either in one direction or the other by differential fluid pressures in the spool end chambers. The fluids are transported through passageways 12 to one side or the other of the spool 4 by a primary drive device 10. The passageways 12 are provided via a primary drive device 10, which exhibits feed channels for providing the fluid to the pilot valves 12, with preferably an incompressible fluid. The feed channels are connected to the pilot valves. Alternatively or in support, the use of the spring 20 can be considered.

The position of the spool 4 in the bushing 3 is determined by an eddy current sensor 7 embedded in the bushing 3, the said sensor forming part of a bushing position determining device 6.

A bushing position determining device 8, such as a Hall effect sensor 9, is also embedded in the housing 2. The Hall effect sensor 9 is located between the housing 2 and the bushing 3. The exact positions of the bushing 3 and the spool 4 with respect to the housing 2 and to one another are determined by the position determination using the bushing position determining device 6 and the bushing position determining device 8. In other embodiments the bushing position determining device 6 and the absolute position determining device 8 comprise other sensors known from the state of the art.

In another form, the primary drive device 10 and the high frequency drive device 11 also use standard known elements from the state of the art.

Alternatively, the movement of the bushing 3 can be advantageously achieved by a transfer of force through a transfer medium, such as an incompressible fluid (*e.g.*, oil), whereby the movement of the spool 4 is also achieved via a transfer medium, such as an incompressible fluid (*e.g.*, oil). The two transfer media can be controlled separately from one another. The possibility of a predefined forced coupling between the two transfer media can also be used here.

The spool can be formed for movement solely through the effect of the transfer medium in both directions. However, it is also possible to provide other movement devices at one end, which, for example, derive their energy from a spring force for moving the spool and/or bushing.

Therefore, while the presently preferred form of the improved valve has been shown and described, and several modifications thereof discussed, persons skilled in this art will readily appreciate that various additional changes and modifications may be made without departing from the spirit of the invention, as defined and differentiated by the following claims.

Claims

What is claimed is:

1. A valve (1), comprising:

a body (2);

a bushing (3) slidably mounted on said body;

a valve spool (4) slidably mounted on said bushing;

said bushing and spool having respective control edges (5) that are adapted to cooperate with one another as a function of the relative position between said bushing and spool to vary the size of a control opening therebetween;

a first drive (11) operatively arranged to controllably move one of said bushing and spool relative to said body; and

a second drive (12) operatively arranged to controllably move the other of said bushing and spool relative to said body;

whereby said first and second drives may be selectively operated to move said bushing and spool simultaneously in opposite directions to increase the dynamic response of said valve.

2. A valve as set forth in claim 1 wherein said first drive includes a piezoelectric element (13) or a plunger coil.

3. A valve as set forth in claim 1, and further comprising:

a spool position sensing device (6) for sensing the position of said spool relative to said bushing.

4. A valve as set forth in claim 3 wherein said spool position sensing device includes an eddy current sensor (7).

5. A valve as set forth in claim 1, and further comprising:

a bushing position sensing device (8) for sensing the position of said bushing

relative to said body.

6. A valve as set forth in claim 5 wherein said bushing position sensing device includes an eddy current sensor, a Hall effect sensor (9), or a linear variable displacement transducer.

7. A valve as set forth in claim 1 whereon said first drive is operatively arranged to control the position of said bushing relative to said body, and wherein said second drive is operatively arranged to control the position of said spool relative to said bushing.

8. A valve as set forth in claim 1 wherein one of said first and second drives has a dynamic response greater than the other of said first and second drives.

9. A valve as set forth in claim 1 wherein one of said first and second drives has a stroke that is greater than that of the other of said first and second drives.

VALVE WITH INCREASED DYNAMIC RESPONSE

Abstract

A valve (1) comprises: a body (2); a bushing (3) slidably mounted on said body; a valve spool (4) slidably mounted on said bushing; said bushing and spool having respective control edges (5) that are adapted to cooperate with one another as a function of the relative position between said bushing and spool to vary the size of a control opening therebetween; a first drive (11) operatively arranged to controllably move one of said bushing and spool relative to said body; and a second drive (12) operatively arranged to controllably move the other of said bushing and spool relative to said body; whereby said first and second drives may be selectively operated to move said bushing and spool simultaneously in opposite directions to increase the dynamic response of said valve.

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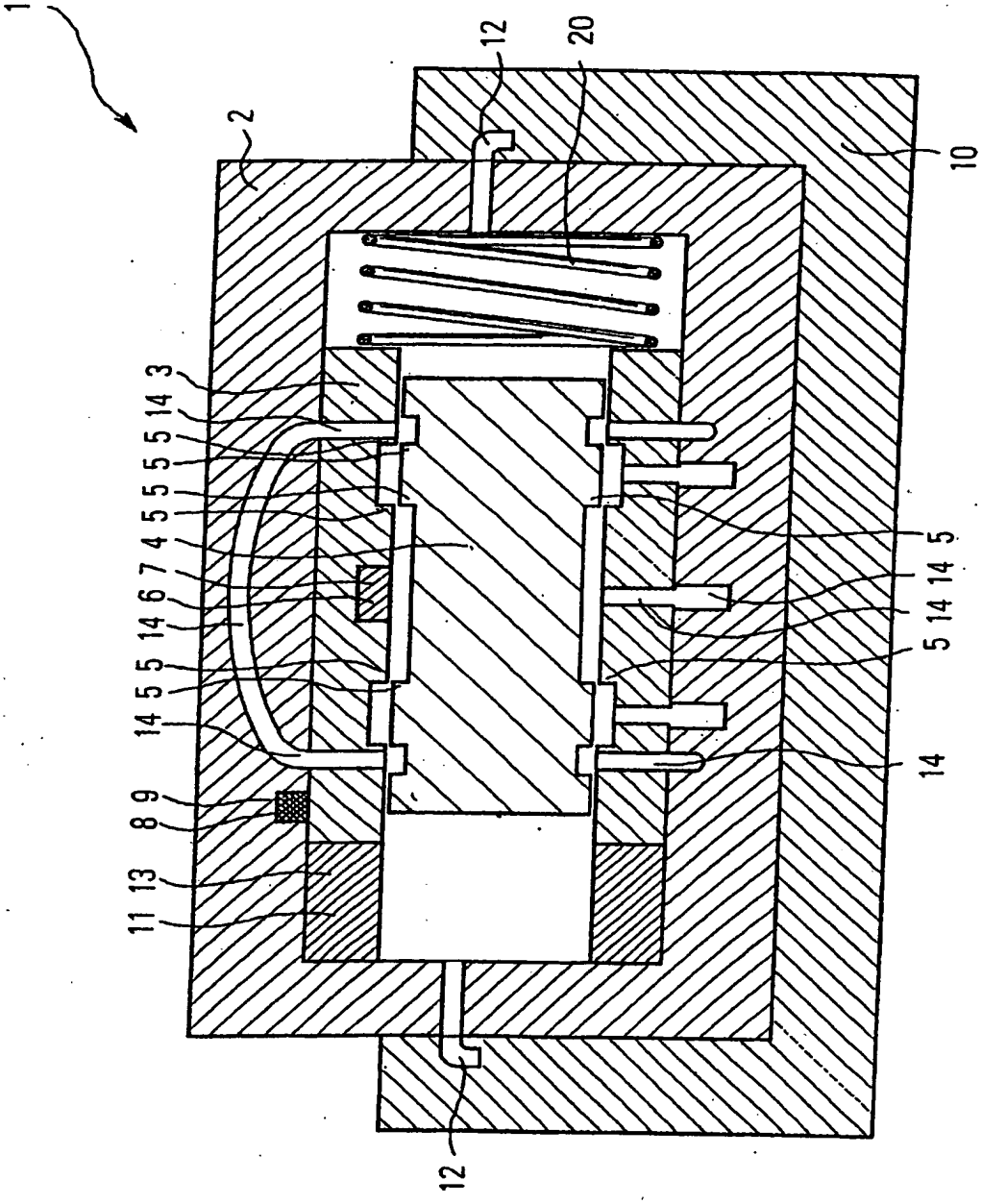

FIG.1

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG

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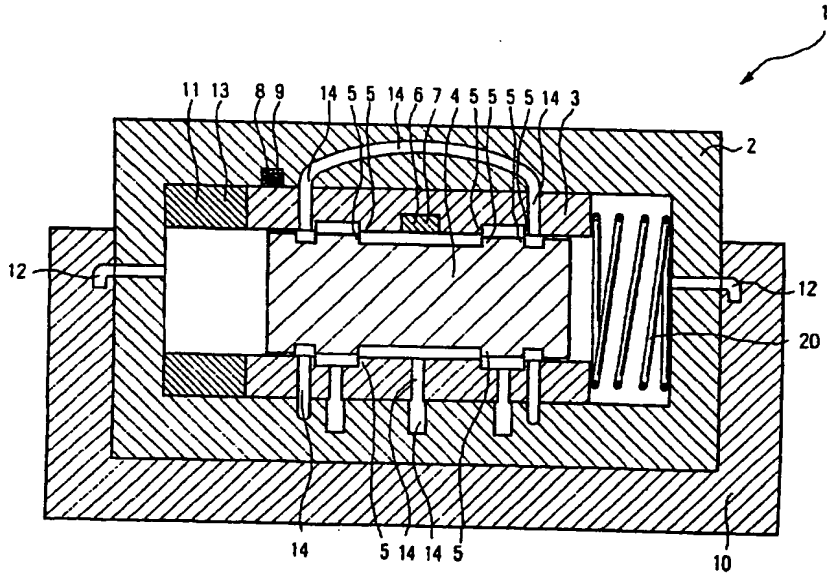
(81) Bestimmungsstaaten *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Bestimmungsstaaten *(regional)*: ARIPO-Patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), eurasisches Patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), europäisches Patent (AT, BE, BG, CH, CY, CZ, DE,

[Fortsetzung auf der nächsten Seite]

(54) Title: HIGHLY DYNAMIC VALVE SERVOCONTROL DEVICE

(54) Bezeichnung: HOCHDYNAMISCHE SERVO-VENTILSTEUERVORRICHTUNG



(57) Abstract: The inventive highly dynamic valve servocontrol device (1) comprises a main body (2) provided with a bushing (3) having control edges and arranged therein and a slide valve (4) which is provided with control edges and arranged in the main body. At least one control edge (5) of the slide valve is constructed in such a way that it is slidable with respect to the control edge of the bushing. Taking into consideration that the modern engineering science has a considerable optimisation potential for process control speed, the slide valve (4) and the bushing (3) are embodied such that they are oppositely slidable with respect to each other and to the main body, thereby achieving faster adjusting time. The inventive product is significantly more resistant than existing products.

[Fortsetzung auf der nächsten Seite]

WO 2004/033921 A1

Hochdynamische Servo-Ventilsteuervorrichtung

Die Erfindung betrifft eine hochdynamische Servo-Ventilsteuervorrichtung mit einer in einem Grundkörper enthaltenen steuerkantenaufweisenden Hülse und einem in dem Grundkörper enthaltenen steuerkantenaufweisenden Schieber, wobei zumindest eine der Steuerkanten des Schiebers relativ zu einer Steuerkante der Hülse verschiebbar ausgestaltet ist.

Aus dem Stand der Technik sind hochdynamische Servo-Ventilsteuervorrichtungen bekannt. Diese Servo-Ventilsteuervorrichtungen werden im Stand der Technik eingesetzt, um Volumenströme und/oder Drücke in hydraulischen Systemen zu steuern oder zu regeln. Um Volumenströme zu verändern, werden, über eine Bewegung von Steuerkanten, etwa auf einem Schieber und unter zu Hilfenahme eines direkten oder indirekten Antriebes, Steuerquerschnitte verändert.

Direkt gesteuerte Ventile umfassen elektromechanische Umformer, Proportionalmagneten, Linearmotoren, Tauchspulen oder piezoelektrische Wandler. Vorgesteuerte Ventile sind indirekt betriebene Antriebe, wie u.a. mechanisch-hydraulischer Umformer, Steuerschieber, Düse-Prallplatte und Strahlrohr. Hochdynamische Servo-Ventilsteuervorrichtungen umfassen sowohl direkte als auch vorgesteuerte Ventile.

Bisher wird lediglich eine Position des Schiebers oder der Hülse variiert und damit auch direkt Steuerquerschnitte der Servo-Ventilsteuervorrichtung. Diese Steuerquerschnitte werden dabei durch zwei Steuerkanten eingegrenzt, wobei der Stand der Technik eine aktive, d.h. in ihrer Lage veränderliche Steuerkante, etwa auf dem Schieber und eine passive, d.h. feststehende Steuerkante, etwa auf der Hülse beinhaltet. Die erreichbare Frequenz der Servo-Ventilsteuervorrichtung wird in den bestehenden Fällen über einen Antrieb des Schiebers und eine zugehörige Ansteuer- oder Regelelektronik vorgegeben.

Direkt gesteuerte Servo-Ventilsteuervorrichtungen haben jedoch den Nachteil, dass schnelle Reaktionen nur mit kurzhubigen Ventilen realisiert werden können.

Ventilsteuervorrichtung ermöglicht. Eine Absolutmessung ist nur notwendig, wenn Schieber und Hülse vorgesteuert sind.

Besonders vorteilhaft ist es in einer Ausgestaltungsvariante auch, wenn die Hülsenpositionsbestimmungseinrichtung oder die Absolutpositionsbestimmungseinrichtung einen Wirbelstromsensor, einen Hall-Effektsensor, oder einen induktiven Wegaufnehmer (LVDT) umfasst. Da etwa das Nutzen der Eigenschaft, dass eine Bewegung von Elektronen im Magnetfeld beeinflusst wird, und eine dabei entstehende Ablenkung als Spannung am Hall-Effektsensor abgreifbar ist, hat dies den Vorteil, dass damit sehr große Magnetfelder gemessen werden können und der Messbereich von Hall-Effektsensoren deutlich größer ist als von anderen Sensoren. Das Verwenden von bekannten Messsensoren in der Hülsenpositionsbestimmungseinrichtung oder der Absolutpositionsbestimmungseinrichtung ist in dieser Variante besonders vorteilhaft, da Kosten und Mühen bei der Beschaffung der entsprechenden Sensoren vermieden werden.
Wenn die Servo-Ventilsteuervorrichtung eine Primärantriebseinrichtung und/oder eine Hochfrequenzantriebseinrichtung umfasst, so ist in dieser Variante vorteilhafterweise sowohl die Hülse als auch der Schieber bewegbar. Auch ist es möglich die zwei unterschiedlichen Antriebseinrichtungsprinzipien, Primärantriebseinrichtung und Hochfrequenzantriebseinrichtung, zu kombinieren.

Wenn die Primärantriebseinrichtung in einer Variante zumindest ein, die Bewegung der Hülse oder des Schiebers beeinflussendes Pilotventil umfasst, so wird vorteilhafterweise auf ein verschleißfreies und robustes Standardbauteil zurückgegriffen.

Besonders vorteilhaft ist es in einer weiteren Ausgestaltungsform auch, wenn die Servo-Ventilsteuervorrichtung zumindest ein, die Bewegung der Hülse steuerndes Pilotventil umfasst und ein, die Bewegung der Schiebers steuerndes Pilotventil umfasst. Es werden somit für Schieber und Hülse antriebsseitig robuste und besonders kleinbauende Elemente verwendet.

Vorteilhaft ist auch in einer Variante, wenn die Servo-Ventilsteuereinrichtung zumindest eine Hochfrequenzantriebseinrichtung umfasst. Eine Hochfrequenzantriebseinrichtung hat den bedeutenden Vorteil, dass sie sehr kurze Ansprechzeiten hat.

Durch die Hülse 3 gehen Durchlassöffnungen hindurch. Die Durchlassöffnungen 14 sind mit Durchlassöffnungen 14 im Grundkörper 2 verbunden.

Die Hülse 3 ist über eine Hochfrequenzantriebseinrichtung 11 in diesem Ausführungsbeispiel verschieblich ausgestaltet. Die Hochfrequenzantriebseinrichtung 11 schiebt die Hülse 3 in die eine Richtung. Die Hochfrequenzantriebseinrichtung 11 umfasst ein Piezoelement 13. Das Piezoelement 13 hat den Vorteil eines sehr schnellen Ansprechens und schiebt die Hülse 3 in die eine Richtung. Eine Rückbewegung erfolgt durch eine Feder 20.

In diesem Ausführungsbeispiel wird der Schieber 4 durch unter Druck stehende Flüssigkeiten entweder in die eine oder andere Richtung bewegt. Die Flüssigkeiten, werden durch Pilotventile 12 auf die eine oder andere Seite des Schiebers 4 von einer Primärantriebseinrichtung 10 befördert. Die Pilotventile 12 werden über die Primärantriebseinrichtung 10, welche Zufuhrkanäle für die Flüssigkeitsbereitstellung zu den Pilotventilen 12 aufweist, mit vorzugsweise einer inkompressiblen Flüssigkeit versorgt. Die Zufuhrkanäle sind mit dem Pilotventilen verbunden. Alternativ oder unterstützend bietet sich auch die Verwendung der Feder 20 an.

Die Position des Schiebers 4 in der Hülse 3 wird über einen in der Hülse 3 eingearbeiteten Wirbelstromsensor 7, der ein Teil einer Hülsenpositionsbestimmungseinrichtung 6 ist, bestimmt.

Im Gehäuse 2 ist auch eine Absolutpositionsbestimmungseinrichtung 8 eingearbeitet. Die Absolutpositionsbestimmungseinrichtung 8 ist in diesem Ausführungsbeispiel ein Hall-Effektsensor 9. Der Hall-Effektsensor 9 befindet sich somit zwischen Gehäuse 2 und Hülse 3. Durch die Positionsbestimmung über die Hülsenpositionsbestimmungseinrichtung 6 und die Absolutpositionsbestimmungseinrichtung 8 wird die genaue Position von Hülse 3 und Schieber 4 zum Gehäuse 2 und untereinander bestimmt. In weiteren Ausführungsbeispielen umfasst die Hülsenpositionsbestimmungseinrichtung 6 und die Absolutpositionsbestimmungseinrichtung 8 weitere aus dem Stand der Technik bekannte Sensoren.

Ansprüche

1. Hochdynamische Servo-Ventilsteuervorrichtung (1) mit einer in einem Grundkörper (2) enthaltenen steuerkantenaufweisenden Hülse (3) und einem in dem Grundkörper (2) enthaltenen steuerkantenaufweisenden Schieber (4), wobei zumindest eine der Steuerkanten (5) des Schiebers (4) relativ zu einer Steuerkante (5) der Hülse (3) verschiebbar ausgestaltet ist, **dadurch gekennzeichnet, dass** der Schieber (4) und auch die Hülse (3) zueinander gegensinnig und relativ zu dem Grundkörper (2) verschiebbar ausgestaltet sind.

2. Hochdynamische Servo-Ventilsteuervorrichtung (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Servo-Ventilsteuervorrichtung (1) eine Hülsenpositionsbestimmungseinrichtung (6) zum Bestimmen einer Position der Hülse (3) in einer Relation zu einer Position des Schiebers (4) umfasst.

3. Hochdynamische Servo-Ventilsteuervorrichtung (1) nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die Hülsenpositionsbestimmungseinrichtung (6) einen Wirbelstromsensor (7) umfasst.

4. Hochdynmaische Servo-Ventilsteuervorrichtung (1) nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** die Servo-Ventilsteuervorrichtung (1) eine Absolutpositionsbestimmungseinrichtung (8) zum Ermitteln der Position von Hülse (3) und Schieber (4) in Relation zum Grundkörper (2) aufweist.

5. Hochdynamische Servo-Ventilsteuervorrichtung (1) nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** die Hülsenpositionsbestimmungseinrichtung (6) oder die Absolutpositionsbestimmungseinrichtung (8) einen Wirbelstromsensor, einen Hall-Effektsensor (9) oder einen induktiven Wegaufnehmer (LVDT) umfasst.

6. Hochdynamische Servo-Ventilsteuervorrichtung (1), nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** die Servoventilsteuervorrichtung (1) eine Primärantriebseinrichtung (10) und/oder Hochfrequenzantriebseinrichtung (14) umfasst.

GEÄNDERTE ANSPRÜCHE

[beim Internationalen Büro am 09 Dezember 2003 (09.12.03) eingegangen; ursprüngliche Ansprüche 1-13 durch neue Ansprüche 1-10 ersetzt (2 Seiten)]

1. Hochdynamische Servo-Ventilsteuervorrichtung (1) mit einer in einem Grundkörper (2) enthaltenen steuerkantenaufweisenden Hülse (3) und einem in dem Grundkörper (2) enthaltenen steuerkantenaufweisenden Schieber (4), wobei zumindest eine der Steuerkanten (5) des Schiebers (4) relativ zu einer Steuerkante (5) der Hülse (3) verschiebbar ausgestaltet ist, wobei der Schieber (4) und auch die Hülse (3) zueinander gegensinnig und relativ zu dem Grundkörper (2) verschiebbar ausgestaltet sind, wobei die Servoventilsteuervorrichtung (1) eine Primärantriebseinrichtung (10) und/oder eine Hochfrequenzantriebseinrichtung (14) umfasst, wobei die Primärantriebseinrichtung (10) zumindest ein die Bewegung der Hülse (3) oder des Schiebers (4) beeinflussendes Pilotventil (12) umfasst, **dadurch gekennzeichnet, dass** die Hochfrequenzantriebseinrichtung (11) ein Piezoelement (13) oder eine Tauchspule umfasst.

2. Hochdynamische Servo-Ventilsteuervorrichtung (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Servo-Ventilsteuervorrichtung (1) eine Hülsenpositionsbestimmungseinrichtung (6) zum Bestimmen einer Position der Hülse (3) in einer Relation zu einer Position des Schiebers (4) umfasst.

3. Hochdynamische Servo-Ventilsteuervorrichtung (1) nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die Hülsenpositionsbestimmungseinrichtung (6) einen Wirbelstromsensor (7) umfasst.

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5. Hochdynamische Servo-Ventilsteuervorrichtung (1) nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** die Hülsenpositionsbestimmungseinrichtung (6) oder die Absolutpositionsbestimmungseinrichtung (8) einen Wir-

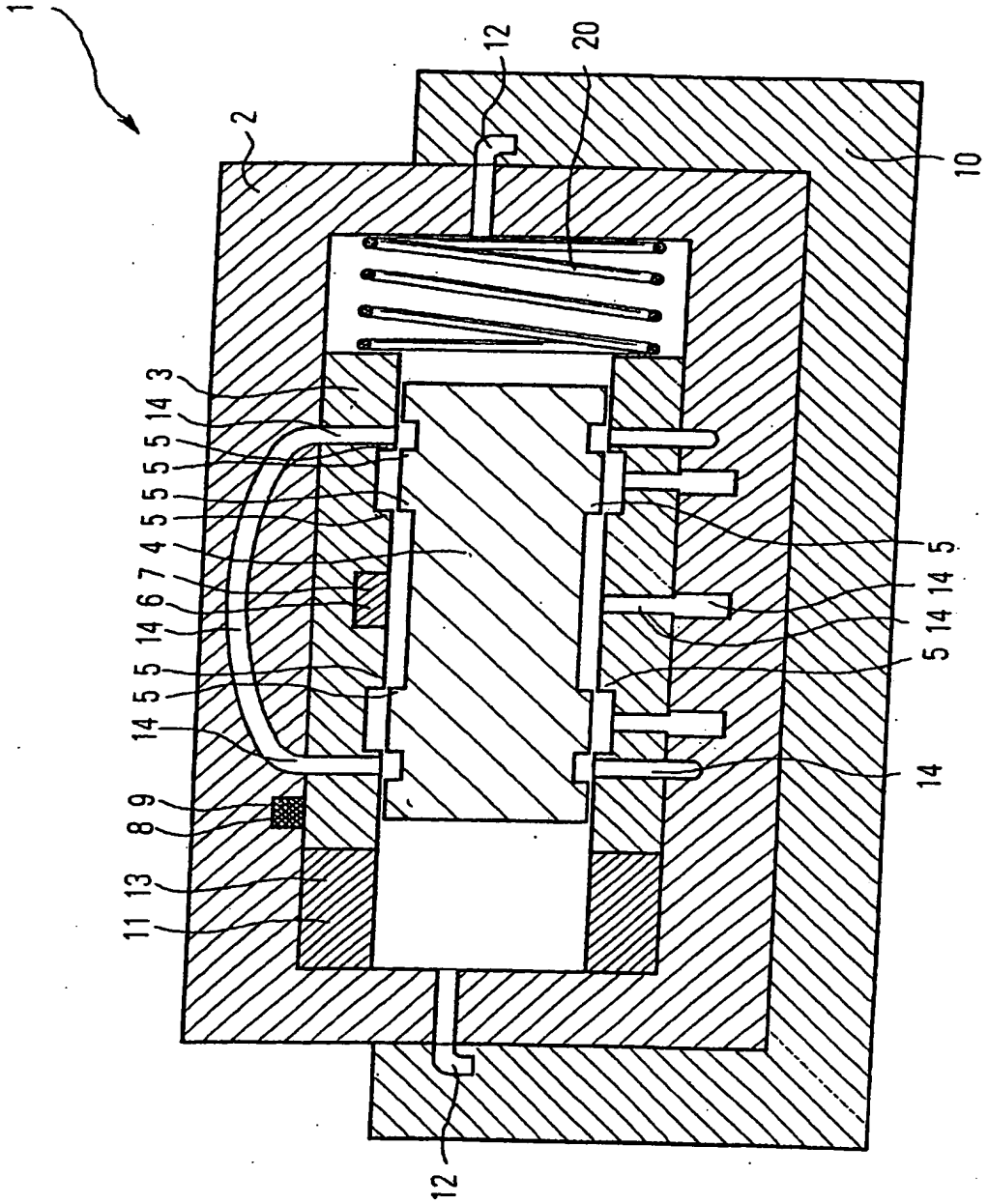

FIG.1

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 03/08550

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 F15B13/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 F15B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 677 672 A (GEN MOTORS CORP) 20 August 1952 (1952-08-20) page 1, line 87 -page 2, line 108; figure 1	1,6,7
X	EP 1 098 101 A (GEN MOTORS CORP) 9 May 2001 (2001-05-09) paragraph '0026! - paragraph '0033!; figures	1,6,7
X	US 4 205 590 A (STEGNER JAMES C) 3 June 1980 (1980-06-03) column 6, line 33 -column 8, line 68; figures 4,5	1,6,7

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
22 October 2003	04/11/2003

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Sbaihi, M

INTERNATIONAL SEARCH REPORT

Information on patent family members

Internat[illegible] Application No
PCT/EP 03/08550

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
GB 677672	A	20-08-1952	NONE		
EP 1098101	A	09-05-2001	US	6179107 B1	30-01-2001
			EP	1098101 A2	09-05-2001
			JP	2001187960 A	10-07-2001
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			GB	2013938 A ,B	15-08-1979
			JP	1463023 C	28-10-1988
			JP	54148984 A	21-11-1979
			JP	62061801 B	23-12-1987
US 4333387	A	08-06-1982	NONE		

INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen
PCT/EP 03/08550

A. KLASSIFIZIERUNG DES ANMELDUNGSGEGENSTANDES
IPK 7 F15B13/04

Nach der Internationalen Patentklassifikation (IPK) oder nach der nationalen Klassifikation und der IPK

B. RECHERCHIERTE GEBIETE

Recherchierter Mindestprüfstoff (Klassifikationssystem und Klassifikationssymbole)
IPK 7 F15B

Recherchierte aber nicht zum Mindestprüfstoff gehörende Veröffentlichungen, soweit diese unter die recherchierten Gebiete fallen

Während der internationalen Recherche konsultierte elektronische Datenbank (Name der Datenbank und evtl. verwendete Suchbegriffe)
EPO-Internal

C. ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategorie*	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
X	GB 677 672 A (GEN MOTORS CORP) 20. August 1952 (1952-08-20) Seite 1, Zeile 87 -Seite 2, Zeile 108; Abbildung 1	1,6,7
X	EP 1 098 101 A (GEN MOTORS CORP) 9. Mai 2001 (2001-05-09) Absatz '0026! - Absatz '0033!; Abbildungen	1,6,7
X	US 4 205 590 A (STEGNER JAMES C) 3. Juni 1980 (1980-06-03) Spalte 6, Zeile 33 -Spalte 8, Zeile 68; Abbildungen 4,5	1,6,7

-/--

[X] Weitere Veröffentlichungen sind der Fortsetzung von Feld C zu entnehmen

[X] Siehe Anhang Patentfamilie

* Besondere Kategorien von angegebenen Veröffentlichungen :

"A" Veröffentlichung, die den allgemeinen Stand der Technik definiert, aber nicht als besonders bedeutsam anzusehen ist

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"Y" Veröffentlichung von besonderer Bedeutung; die beanspruchte Erfindung kann nicht als auf erfinderischer Tätigkeit beruhend betrachtet werden, wenn die Veröffentlichung mit einer oder mehreren anderen Veröffentlichungen dieser Kategorie in Verbindung gebracht wird und diese Verbindung für einen Fachmann naheliegend ist

"&" Veröffentlichung, die Mitglied derselben Patentfamilie ist

Datum des Abschlusses der internationalen Recherche	Absendedatum des internationalen Recherchenberichts
22. Oktober 2003	04/11/2003

Name und Postanschrift der Internationalen Recherchenbehörde	Bevollmächtigter Bediensteter
Europäisches Patentamt, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Sbaihi, M

Formblatt PCT/ISA/210 (Blatt 2) (Juli 1992)

INTERNATIONALER RECHERCHENBERICHT

Angaben zu Veröffentlichungen, die zur selben Patentfamilie gehören

Internationales Aktenzeichen
PCT/EP 03/08550

Im Recherchenbericht angeführtes Patentdokument		Datum der Veröffentlichung	Mitglied(er) der Patentfamilie		Datum der Veröffentlichung
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			EP	1098101 A2	09-05-2001
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			GB	2013938 A ,B	15-08-1979
			JP	1463023 C	28-10-1988
			JP	54148984 A	21-11-1979
			JP	62061801 B	23-12-1987
US 4333387	A	08-06-1982	KEINE		

Highly dynamic valve servocontrol device

The invention relates to a highly dynamic valve servocontrol device with a bushing having control edges and contained in a main body and a slide valve having control edges contained in the main body, wherein at least one of the slide valve control edges can slide with respect to a control edge on the bushing.

Highly dynamic valve servocontrol devices are known from the state of the art. These valve servocontrol devices are used in the state of the art to control, in either open or closed loops, volume flows and / or pressures in hydraulic systems. To change volume flows, control cross-sections are changed through a movement of control edges, possibly on a slide valve and with the aid of a direct or indirect drive.

Directly controlled valves comprise electromechanical transformers, proportional magnets, linear motors, plunger coils or piezoelectric converters. Servo-assisted valves are indirectly driven drives, such as for example, mechanical-hydraulic transformers, spool valves, nozzle baffles and nozzle pipes. Highly dynamic valve servocontrol devices comprise both direct as well as servo-assisted valves.

Previously, only one position of the slide valve or the bushing was varied and consequently also direct control cross-sections of the valve servocontrol device. These control cross-sections are here bounded by two control edges, whereby the state of the art includes an active, i.e. changing in its position, control edge, possibly on the slide valve, and a passive, i.e. fixed control edge, possibly on the bushing. The attainable frequency of the valve servocontrol device is in the existing cases provided by a slide valve drive and an associated drive or control electronic unit.

Directly controlled valve servocontrol devices have however the disadvantage that fast reactions can only be realised with short-stroke valves.

It is therefore the object of this invention to facilitate the highly dynamic control of the valve servocontrol device.

This is achieved in that the slide valve and also the bushing are embodied such that they are oppositely slidable to one another and can be moved relative to the main body 2.

The distances to be covered by the slide valve or bushing during a control movement are therefore clearly smaller. The times taken from one control state to the next are shorter. Highly dynamic control of the valve servocontrol device is therefore possible. Also, existing freely obtainable standard components can be used in a valve servocontrol device according to the invention. This simplifies the procurement of the individual elements for assembly.

Special implementation variants are described in more detail in the subclaims.

It is especially advantageous if the valve servocontrol device comprises a device determining the bushing position relative to a position of the slide valve. In this type of embodiment it is possible to determine the exact position of the slide valve with respect to the bushing and to actuate the valve servocontrol device accordingly.

Also in a further variant it is especially advantageous if the bushing position determining device comprises an eddy current sensor. A non-contacting eddy current sensor operates without wear and is rugged. Also it is extremely resistant to corrosion, whereby the service life of the valve servocontrol device is increased.

If, in a variant, the valve servocontrol device exhibits an absolute position determining device for determining the position of the bushing and slide valve with respect to the main body, then the exact position of the bushing and slide valve to the main body can be found advantageously in this variant. This facilitates the avoidance of drift of the bushing and slide valve in the main body. Consequently, trouble-free functioning of the valve servocontrol device is enabled also over a lengthy period of use. An absolute measurement is only necessary if the slide valve and bushing are servo-assisted.

In a constructional variant it is also especially advantageous if the bushing position determining device or the absolute position determining device comprises an eddy current sensor, a Hall effect sensor or an inductive displacement transducer (LVDT). Since possibly the exploitation of the property that a movement of electrons in the magnetic field is influenced and a thereby ensuing deflection can be acquired as a voltage on the Hall effect sensor, this has the advantage that very large magnetic fields can be measured and the measurement range of Hall effect sensors is noticeably larger than those of other sensors. The use of known measurement sensors in the bushing position determining device or in the absolute position determining device is especially advantageous in this variant, because costs and effort in the procurement of the appropriate sensors can be avoided.
If the valve servocontrol device comprises a primary drive device and / or a high frequency drive device, then in this variant it is advantageous if both the bushing and the slide valve are movable. Also, it is possible to combine the two different drive device principles, primary drive device and high frequency drive device.

If in one variant the primary drive device comprises at least one pilot valve influencing the movement of the bushing or the slide valve, then the application of a wear-free and rugged standard component is advantageously taken up.

In another embodiment it is especially advantageous if the valve servocontrol device comprises at least one pilot valve controlling the movement of the bushing and a pilot valve controlling the movement of the

slide valve. Rugged and particularly small and compact elements are then used for the slide valve and the bushing on the drive side.

In one variant it is also advantageous if the valve servocontrol device at least comprises a high frequency drive device. A high frequency drive device has the significant advantage that it has very short response times.

If the high frequency drive device comprises a piezoelement or a plunger coil, small dimensions of the high frequency drive devices are possible. Small installation spaces are desirable.

It is also advantageous in a variant if the high frequency drive device controls at least a displacement of the bushing. Consequently, the response time of the bushing is minimised during the control.

In a further embodiment it is advantageous if the high frequency drive device exhibits a high inherent dynamic response and a low stroke and the primary drive device exhibits a low inherent dynamic response and a large stroke. Since the high frequency drive device effectively complements the primary drive device in terms of inherent dynamic response and servo gain, particularly fast control times are possible. The combination of a highly dynamic response / short stroke and medium (low) dynamic response / long stroke leads to high servo gain.

If the high frequency drive device exhibits a low inherent dynamic response and a large stroke, and the primary drive device exhibits a high inherent dynamic response and a low stroke, then in another variant an exchange of high frequency drive device elements with primary drive device elements is possible. The advantage of a particularly fast control of the individual components of the valve servocontrol device is however ensured.

In the following, embodiments of this invention are explained in more detail based on a drawing. The following are shown:

Figure 1: The cross-section through a highly dynamic valve servocontrol device.

In Figure 1 the valve servocontrol device 1 is shown in a cross-section. The valve servocontrol device 1 comprises a main body 2 in which a bushing 3 is supported. The bushing 3 exhibits control edges 5. The control edges 5 are formed in the interior of the bushing 3. In the interior of the bushing 3 a slide valve 4 with control edges 5 formed on the circumference is formed for movement within the bushing 3.

Through openings pass through the bushing 3. The through openings 14 are connected with through openings 14 in the main body 2.

The bushing 3 is constructed for movement using a high frequency drive device 11 in this embodiment. The high frequency drive device 11 slides the bushing 3 in one direction. The high frequency drive device 11 comprises the piezoelement 13. The piezoelement 13 has the advantage of a very fast response and pushes the bushing 3 in one direction. A return movement is provided by a spring 20.

In this embodiment the slide valve 4 is moved either in one direction or the other by fluids under pressure. The fluids are transported through pilot valves 12 to one side or the other of the slide valve 4 by a primary drive device 10. The pilot valves 12 are supplied via the primary drive device 10, which exhibits feed channels for providing the fluid to the pilot valves 12, with preferably an incompressible fluid. The feed channels are connected to the pilot valves. Alternatively or in support, the use of the spring 20 can be considered.

The position of the slide valve 4 in the bushing 3 is determined by an eddy current sensor 7 embedded in the bushing 3, the said sensor forming part of a bushing position determining device 6.

An absolute position determining device 8 is also embedded in the housing 2. The absolute position determining device 8 is in this embodiment a Hall effect sensor 9. The Hall effect sensor 9 is located therefore between the housing 2 and the bushing 3. The exact positions of the bushing 3 and the slide valve 4 with respect to the housing 2 and to one another are determined by the position determination using the bushing position determining device 6 and the absolute position determining device 8. In other embodiments the bushing position determining device 6 and the absolute position determining device 8 comprise other sensors known from the state of the art.

In another variant the primary drive device 10 and the high frequency drive device 11 also use standard known elements from the state of the art.

Alternatively, the movement of the bushing 3 can be advantageously achieved by a transfer of force through a transfer medium, such as an incompressible fluid such as oil, whereby the movement of the slide valve 4 is also achieved via a transfer medium, such as an incompressible fluid such as oil. The two transfer media can be controlled separately from one another. The possibility of a predefined forced coupling between the two transfer media can also be used here.

The slide valve can be formed for movement solely through the effect of the transfer medium in both directions. However, it is also possible to provide other movement devices at one end, which, for example, derive their energy from a spring force for moving the slide valve and / or bushing.

Claims

1. Highly dynamic valve servocontrol device (1) with a bushing (3) exhibiting control edges and contained in a main body (2), and a slide valve (4) exhibiting control edges and contained in the main body (2), wherein at least one of the control edges (5) of the slide valve (4) can slide with respect to a control edge (5) of the bushing (3), **characterised in that** the slide valve (4) and also the bushing (3) are embodied such that they are oppositely slidable to one another and can be moved relative to the main body (2).

2. Highly dynamic valve servocontrol device (1) according to Claim 1, **characterised in that** the valve servocontrol device (1) comprises a bushing position determining device (6) for determining a position of the bushing (3) in relation to a position of the slide valve (4).

3. Highly dynamic valve servocontrol device (1) according to Claim 1 or 2, **characterised in that** the bushing position determining device (6) comprises an eddy current sensor (7).

4. Highly dynamic valve servocontrol device (1) according to one of the Claims 1 to 3, **characterised in that** the valve servocontrol device (1) exhibits an absolute position determining device (8) for the determination of the position of the bushing (3) and slide valve (4) in relation to the main body (2).

5. Highly dynamic valve servocontrol device (1) according to one of the Claims 1 to 4, **characterised in that** the bushing position determining device (6) or the absolute position determining device (8) comprises an eddy current sensor, a Hall effect sensor (9) or an inductive displacement transducer (LVDT).

6. Highly dynamic valve servocontrol device (1) according to one of the Claims 1 to 5, **characterised in that** the valve servocontrol device (1) comprises a primary drive device (10) and / or a high frequency drive device (14).

7. Highly dynamic valve servocontrol device (1) according to one of the Claims 1 to 6, **characterised in that** the primary drive device (10) comprises at least one pilot valve (12) influencing the movement of the bushing (3) or the slide valve (4).

8. Highly dynamic valve servocontrol device (1) according to one of the Claims 1 to 7, **characterised in that** the valve servocontrol device (1) comprises at least one pilot valve (12) controlling the movement of the bushing (3) and a pilot valve (12) controlling the movement of the slide valve (4).

9. Highly dynamic valve servocontrol device (1) according to one of the Claims 1 to 8, **characterised in that** the valve servocontrol device (1) comprises at least one high frequency drive device (11).

10. Highly dynamic valve servocontrol device (1) according to one of the Claims 1 to 9, **characterised in that** the high frequency drive device (11) comprises a piezoelement (13) or a plunger coil.

11. Highly dynamic valve servocontrol device (1) according to one of the Claims 1 to 10, **characterised in that** the high frequency drive device (11) controls at least one movement of the bushing (3).

12. Highly dynamic valve servocontrol device (1) according to one of the Claims 1 to 11, **characterised in that** the high frequency drive device (11) exhibits a high inherent dynamic response and a low stroke, and that the primary drive device (10) exhibits a low inherent dynamic response and a large stroke.

13. Highly dynamic valve servocontrol device (1) according to one of the Claims 1 to 12, **characterised in that** the high frequency drive device (11) exhibits a low inherent dynamic response and a large stroke, and that the primary drive device (10) exhibits a high inherent dynamic response and a low stroke.

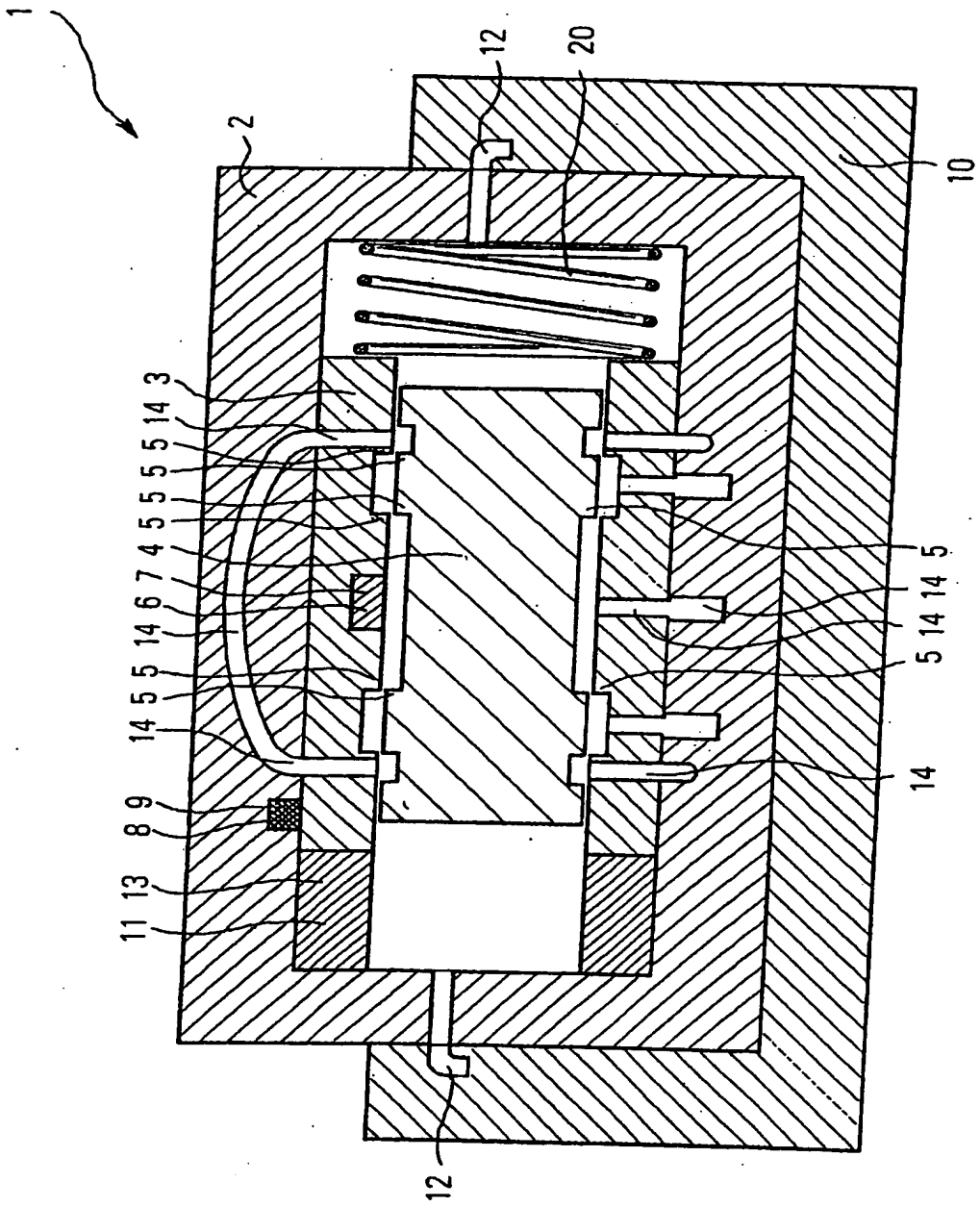

FIG.1

MODIFIED CLAIMS

[Arrived at the International Office on 9th December 2003 (09.12.03);
original Claims 1-13 replaced by new Claims 1-10 (2 pages)]

1. Highly dynamic valve servocontrol device (1) with a bushing (3) exhibiting control edges and contained in a main body (2), and a slide valve (4) exhibiting control edges and contained in the main body (2), wherein at least one of the control edges (5) of the slide valve (4) can slide with respect to a control edge (5) of the bushing (3), wherein the slide valve (4) and also the bushing (3) are embodied such that they are oppositely slidable to one another and can be moved relative to the main body (2), wherein the valve servocontrol device (1) comprises a primary drive device (10) and / or a high frequency drive device (14), wherein the primary drive device (10) comprises at least one pilot valve (12) which can influence the movement of the bushing (3) or slide valve (4), **characterised in that** the high frequency drive device (11) comprises a piezoelement (13) or a plunger coil.

2. Highly dynamic valve servocontrol device (1) according to Claim 1, **characterised in that** the valve servocontrol device (1) comprises a bushing position determining device (6) for determining a position of the bushing (3) in relation to a position of the slide valve (4).

3. Highly dynamic valve servocontrol device (1) according to Claim 1 or 2, **characterised in that** the bushing position determining device (6) comprises an eddy current sensor (7).

4. Highly dynamic valve servocontrol device (1) according to one of the Claims 1 to 3, **characterised in that** the valve servocontrol device (1) exhibits an absolute position determining device (8) for the determination of the position of the bushing (3) and slide valve (4) in relation to the main body (2).

5. Highly dynamic valve servocontrol device (1) according to one of the Claims 1 to 4, **characterised in that** the bushing position determining device (6) or the absolute position determining device (8) comprises an eddy current sensor, a Hall effect sensor (9) or an inductive displacement transducer (LVDT).

MODIFIED PAGE (ARTICLE 19)

6. Highly dynamic valve servocontrol device (1) according to one of the Claims 1 to 5, **characterised in that** the valve servocontrol device (1) comprises at least one pilot valve (12) controlling the movement of the bushing (3) and a pilot valve (12) controlling the movement of the slide valve (4).

7. Highly dynamic valve servocontrol device (1) according to one of the Claims 1 to 6, **characterised in that** the valve servocontrol device (1) comprises at least one high frequency drive device (11).

8. Highly dynamic valve servocontrol device (1) according to one of the Claims 1 to 7, **characterised in that** the high frequency drive device (11) controls at least one movement of the bushing (3).

9. Highly dynamic valve servocontrol device (1) according to one of the Claims 1 to 8, **characterised in that** the high frequency drive device (11) exhibits a high inherent dynamic response and a low stroke, and that the primary drive device (10) exhibits a low inherent dynamic response and a large stroke.

10. Highly dynamic valve servocontrol device (1) according to one of the Claims 1 to 9, **characterised in that** the high frequency drive device (11) exhibits a low inherent dynamic response and a large stroke, and that the primary drive device (10) exhibits a high inherent dynamic response and a low stroke.

MODIFIED PAGE (ARTICLE 19)

Claims

1. Highly dynamic valve servocontrol device (1) with a bushing (3) exhibiting control edges and contained in a main body (2), and a slide valve (4) exhibiting control edges and contained in the main body (2), wherein at least one of the control edges (5) of the slide valve (4) can slide with respect to a control edge (5) of the bushing (3), wherein the slide valve (4) and also the bushing (3) are embodied such that they are oppositely slidable to one another and can be moved relative to the main body (2), wherein the valve servocontrol device (1) comprises a primary drive device (10) and a high frequency drive device (14), wherein the primary drive device (10) comprises at least one pilot valve (12) which can influence the movement of the bushing (3) or slide valve (4), **characterised in that** the high frequency drive device (11) comprises a piezoelement (13) or a plunger coil.

2. Highly dynamic valve servocontrol device (1) according to Claim 1, **characterised in that** the valve servocontrol device (1) comprises a bushing position determining device (6) for determining a position of the bushing (3) in relation to a position of the slide valve (4).

3. Highly dynamic valve servocontrol device (1) according to Claim 2, **characterised in that** the bushing position determining device (6) comprises an eddy current sensor (7).

4. Highly dynamic valve servocontrol device (1) according to one of the Claims 1 to 3, **characterised in that** the valve servocontrol device (1) exhibits an absolute position determining device (8) for the determination of the position of the bushing (3) and slide valve (4) in relation to the main body (2).

5. Highly dynamic valve servocontrol device (1) according to one of the Claims 1 to 4, **characterised in that** the bushing position determining device (6) or the absolute position determining device (8) comprises an eddy current sensor, a Hall effect sensor (9) or an inductive displacement transducer (LVDT).

6. Highly dynamic valve servocontrol device (1) according to one of the Claims 1 to 5, **characterised in that** the valve servocontrol device (1) comprises at least one pilot valve (12) controlling the movement of the bushing (3) or comprises a pilot valve (12) controlling the movement of the slide valve (4).

7. Highly dynamic valve servocontrol device (1) according to one of the Claims 1 to 6, **characterised in that** the high frequency drive device (11) controls at least one movement of the bushing (3).

8. Highly dynamic valve servocontrol device (1) according to one of the Claims 1 to 7, **characterised in that** the high frequency drive device (11) exhibits a high inherent dynamic response and a low stroke, and that the primary drive device (10) exhibits a low inherent dynamic response and a large stroke.

9. Highly dynamic valve servocontrol device (1) according to one of the Claims 1 to 8, **characterised in that** the high frequency drive device (11) exhibits a low inherent dynamic response and a large stroke, and that the primary drive device (10) exhibits a high inherent dynamic response and a low stroke.

PCT

ANTRAG

Der Unterzeichnete beantragt, daß die vorliegende internationale Anmeldung nach dem Vertrag über die internationale Zusammenarbeit auf dem Gebiet des Patentwesens behandelt wird.

Vom Anmeldeamt auszufüllen

Internationales Aktenzeichen: PCT/EP03/08550

Internationales Anmeldedatum: 01 AUG 2003 (01.08.03)

EUROPEAN PATENT OFFICE
PCT INTERNATIONAL APPLICATION

Name des Anmeldeamts und "PCT International Application"

Aktenzeichen des Anmelders oder Anwalts *(falls gewünscht)* *(max. 12 Zeichen)*: PCT 1904-114

Feld Nr. I BEZEICHNUNG DER ERFINDUNG

Hochdynamische Servo-Ventilsteuervorrichtung

Feld Nr. II ANMELDER ☐ Diese Person ist gleichzeitig Erfinder

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☒ **EA** **Eurasisches Patent:** AM Armenien, AZ Aserbaidschan, BY Belarus, KG Kirgisistan, KZ Kasachstan, MD Republik Moldau, RU Russische Föderation, TJ Tadschikistan, TM Turkmenistan und jeder weitere Staat, der Vertragsstaat des Eurasischen Patentübereinkommens und des PCT ist

☒ **EP** **Europäisches Patent:** AT Österreich, BE Belgien, BG Bulgarien, CH &LI Schweiz und Liechtenstein, CY Zypern, CZ Tschechische Republik, DE Deutschland, DK Dänemark, EE Estland, ES Spanien, FI Finnland, FR Frankreich, GB Vereinigtes Königreich, GR Griechenland, IE Irland, IT Italien, LU Luxemburg, MC Monaco, NL Niederlande, PT Portugal, SE Schweden, SI Slowenien, SK Slowakei, TR Türkei und jeder weitere Staat, der Vertragsstaat des Europäischen Patentübereinkommens und des PCT ist

☒ **OA** **OAPI-Patent:** BF Burkina Faso, BJ Benin, CF Zentralafrikanische Republik, CG Kongo, CI Côte d'Ivoire, CM Kamerun, GA Gabun, GN Guinea, GQ Äquatorialguinea, GW Guinea-Bissau, ML Mali, MR Mauretanien, NE Niger, SN Senegal, TD Tschad, TG Togo und jeder weitere Staat, der Vertragsstaat der OAPI und des PCT ist *(falls eine andere Schutzrechtsart oder ein sonstiges Verfahren gewünscht wird, bitte auf der gepunkteten Linie angeben)* .....

Nationales Patent *(falls eine andere Schutzrechtsart oder ein sonstiges Verfahren gewünscht wird, bitte auf der gepunkteten Linie angeben):*

☒ AE Vereinigte Arabische Emirate ....
☒ AG Antigua und Barbuda
☒ AL Albanien .....
☒ AM Armenien .....
☒ AT Österreich .....
☒ AU Australien .....
☒ AZ Aserbaidschan .....
☒ BA Bosnien-Herzegovina .....
☒ BB Barbados
☒ BG Bulgarien .....
☒ BR Brasilien .....
☒ BY Belarus .....
☒ BZ Belize .....
☒ CA Kanada
☒ CH & LI Schweiz und Liechtenstein
☒ CN China .....
☒ CO Kolumbien
☒ CR Costa Rica .....
☒ CU Kuba .....
☒ CZ Tschechische Republik .....
☒ DE Deutschland .....
☒ DK Dänemark .....
☒ DM Dominica
☒ DZ Algerien .....
☒ EC Ecuador .....
☒ EE Estland .....
☒ ES Spanien .....
☒ FI Finnland .....
☒ GB Vereinigtes Königreich
☒ GD Grenada
☒ GE Georgien .....
☒ GH Ghana .....
☒ GM Gambia
☒ HR Kroatien .....
☒ HU Ungarn .....
☒ ID Indonesien
☒ IL Israel .....
☒ IN Indien .....
☒ IS Island
☒ JP Japan .....
☒ KE Kenia .....
☒ KG Kirgisistan .....
☒ KP Demokratische Volksrepublik Korea .....
☒ KR Republik Korea .....
☒ KZ Kasachstan .....
☒ LC Saint Lucia
☒ LK Sri Lanka
☒ LR Liberia
☒ LS Lesotho .....
☒ LT Litauen
☒ LU Luxemburg
☒ LV Lettland
☒ MA Marokko .....
☒ MD Republik Moldau .....
.....
☒ MG Madagaskar .....
☒ MK Die ehemalige jugoslawische Republik Mazedonien .....
☒ MN Mongolei
☒ MW Malawi .....
☒ MX Mexiko .....
☒ MZ Mosambik .....
☒ NO Norwegen
☒ NZ Neuseeland .....
☒ OM Oman
☒ PH Philippinen .....
☒ PL Polen .....
☒ PT Portugal .....
☒ RO Rumänien
☒ RU Russische Föderation .....
.....
☒ SC Seychellen
☒ SD Sudan
☒ SE Schweden
☒ SG Singapur
☒ SK Slowakei .....
☒ SL Sierra Leone .....
☒ TJ Tadschikistan .....
☒ TM Turkmenistan .....
☒ TN Tunesien
☒ TR Türkei .....
☒ TT Trinidad und Tobago .....
.....
☒ TZ Vereinigte Republik Tansania
☒ UA Ukraine .....
☒ UG Uganda .....
☒ US Vereinigte Staaten von Amerika ..
.....
☒ UZ Usbekistan .....
☒ VC St. Vincent und die Grenadinen
☒ VN Vietnam .....
☒ YU Jugoslawien .....
☒ ZA Südafrika .....
☒ ZM Sambia
☒ ZW Simbabwe .....

Kästchen für die Bestimmung von Staaten, die dem PCT nach der Veröffentlichung dieses Formblatts beigetreten sind.

☒ NI Nicaragua .....
☒ PG Papua New Guinea .....
☒ SY Syrian Arab Republic .....
☐ .....
☐ .....
☐ .....

Erklärung bzgl. vorsorglicher Bestimmungen: Zusätzlich zu den oben genannten Bestimmungen nimmt der Anmelder nach Regel 4.9 Absatz b auch alle anderen nach dem PCT zulässigen Bestimmungen vor mit Ausnahme der im Zusatzfeld genannten Bestimmungen, die von dieser Erklärung ausgenommen sind. Der Anmelder erklärt, daß diese zusätzlichen Bestimmungen unter dem Vorbehalt einer Bestätigung stehen und jede zusätzliche Bestimmung, die vor Ablauf von 15 Monaten ab dem Prioritätsdatum nicht bestätigt wurde, nach Ablauf dieser Frist als vom Anmelder zurückgenommen gilt. *(Die Bestätigung (einschließlich der Gebühren) muß beim Anmeldeamt innerhalb der Frist von 15 Monaten eingehen.)*

Feld Nr. VI PRIORITÄTSANSPRUCH

Die Priorität der folgenden früheren Anmeldung(en) wird hiermit in Anspruch genommen:

Anmeldedatum der früheren Anmeldung *(Tag/Monat/Jahr)*	Aktenzeichen der früheren Anmeldung	Ist die frühere Anmeldung eine:		
		nationale Anmeldung: Staat oder Mitglied der WTO	regionale Anmeldung:* regionales Amt	internationale Anmeldung: Anmeldeamt
Zeile (1) 11. September 2003 (11.09.2003)	102 41 977.9	Deutschland		
Zeile (2)				
Zeile (3)				
Zeile (4)				
Zeile (5)				

☐ Weitere Prioritätsansprüche sind im Zusatzfeld angegeben.

Das Anmeldeamt wird ersucht, eine beglaubigte Abschrift der oben bezeichneten früheren Anmeldung(en) zu erstellen und dem internationalen Büro zu übermitteln *(nur falls die frühere Anmeldung(en) bei dem Amt eingereicht worden ist (sind), das für die Zwecke dieser internationalen Anmeldung Anmeldeamt ist)*:

☐ sämtliche Zeilen ☐ Zeile (1) ☐ Zeile (2) ☐ Zeile (3) ☐ Zeile (4) ☐ Zeile (5) ☐ weitere, siehe Zusatzfeld

** Falls es sich bei der früheren Anmeldung um eine ARIPO-Anmeldung handelt, geben Sie mindestens einen Staat an, der Mitgliedstaat der Pariser Verbandsübereinkunft zum Schutz des gewerblichen Eigentums oder Mitglied der Welthandelsorganisation ist und für den oder das die frühere Anmeldung eingereicht wurde:* .....

Feld Nr. VII INTERNATIONALE RECHERCHENBEHÖRDE

Wahl der internationalen Recherchenbehörde (ISA) *(falls zwei oder mehr als zwei internationale Recherchenbehörden für die Ausführung der internationalen Recherche zuständig sind, geben Sie die von Ihnen gewählte Behörde an; der Zweibuchstaben-Code kann benutzt werden)*:

ISA / .....

Antrag auf Nutzung der Ergebnisse einer früheren Recherche; Bezugnahme auf diese frühere Recherche *(falls eine frühere Recherche bei der internationalen Recherchenbehörde beantragt oder von ihr durchgeführt worden ist)*:

Datum *(Tag/Monat/Jahr)* Aktenzeichen Staat *(oder regionales Amt)*

Feld Nr. VIII ERKLÄRUNGEN

Die Felder Nr. VIII (i) bis (v) enthalten die folgenden Erklärungen *(Kreuzen Sie unten die entsprechenden Kästchen an und geben Sie in der rechten Spalte für jede Erklärung deren Anzahl an)* :

Anzahl der Erklärungen

☐ Feld Nr. VIII (i)	Erklärung hinsichtlich der Identität des Erfinders	:
☐ Feld Nr. VIII (ii)	Erklärung hinsichtlich der Berechtigung des Anmelders, zum Zeitpunkt des internationalen Anmeldedatums, ein Patent zu beantragen und zu erhalten	:
☐ Feld Nr. VIII (iii)	Erklärung hinsichtlich der Berechtigung des Anmelders, zum Zeitpunkt des internationalen Anmeldedatums, die Priorität einer früheren Anmeldung zu beanspruchen	:
☐ Feld Nr. VIII (iv)	Erfindererklärung (nur im Hinblick auf die Bestimmung der Vereinigten Staaten von Amerika)	:
☐ Feld Nr. VIII (v)	Erklärung hinsichtlich unschädlicher Offenbarungen oder Ausnahmen von der Neuheitsschädlichkeit	:

Blatt Nr. 5

Feld Nr. IX KONTROLLISTE; EINREICHUNGSSPRACHE

Diese internationale Anmeldung **enthält:**

(a) **auf Papier**, die folgende Anzahl Blätter:

Antrag (inklusive Erklärungsblätter)	:	5
Beschreibung (ohne Sequenzprotokolle und/oder diesbezügliche Tabellen)	:	6
Ansprüche	:	2
Zusammenfassung	:	1
Zeichnungen	:	1
Teilanzahl	:	15
Sequenzprotokolle	:	
diesbezügliche Tabellen	:	
(für beide, Anzahl der Blätter, soweit auf Papier eingereicht wird, unabhängig davon, ob zusätzlich auch in computerlesbarer Form eingereicht wird; siehe unter (c))		
Gesamtanzahl	:	15

(b) ☐ **ausschließlich in computerlesbarer Form** (Abschnitt 801(a)(i))
- (i) ☐ Sequenzprotokolle
- (ii) ☐ diesbezügliche Tabellen

(c) ☐ **auch in computerlesbarer Form** (Abschnitt 801(a)(ii))
- (i) ☐ Sequenzprotokolle
- (ii) ☐ diesbezügliche Tabellen

Art und Anzahl der Datenträger (Diskette, CD-ROM, CD-R oder sonstige) auf denen sich befinden
- (i) ☐ Sequenzprotokolle: .....
- (ii) ☐ diesbezügliche Tabellen: .....

(zusätzliche eingereichte Kopien unter Punkt 9(ii) und/oder 10(ii) in der rechten Spalte angeben)

Dieser internationalen Anmeldung liegen die folgenden Unterlagen bei *(kreuzen Sie die entsprechenden Kästchen an und geben Sie in der rechten Spalte jeweils die Anzahl der beiliegenden Exemplare an)* — Anzahl

1. ☒ Blatt für die Gebührenberechnung : 1
2. ☐ Original einer gesonderten Vollmacht :
3. ☐ Original einer allgemeinen Vollmacht :
4. ☐ Kopie der allgemeinen Vollmacht; Aktenzeichen (falls vorhanden): ..... :
5. ☐ Begründung für das Fehlen einer Unterschrift :
6. ☐ Prioritätsbeleg(e), in Feld Nr. VI durch folgende Zeilennummer(n) gekennzeichnet: ..... :
7. ☐ Übersetzung der internationalen Anmeldung in die folgende Sprache: ..... :
8. ☐ Gesonderte Angaben zu hinterlegten Mikroorganismen oder anderem biologischen Material :
9. ☐ Sequenzprotokolle in computerlesbarer Form *(Art und Anzahl der Datenträger)*
   - (i) ☐ Kopie ausschließlich für die Zwecke der internationalen Recherche nach Regel 13*ter* (und nicht als Teil der internationalen Anmeldung) :
   - (ii) ☐ *(nur falls Felder (b)(i) oder (c)(i) in der linken Spalte angekreuzt wurden)* zusätzliche Kopien einschließlich, soweit zutreffend, einer Kopie für die Zwecke der internationalen Recherche nach Regel 13*ter* :
   - (iii) ☐ zusammen mit entsprechender Erklärung, daß die Kopie(n) mit dem in der linken Spalte aufgeführten Sequenzprotokollen identisch ist (sind) :
10. ☐ Tabellen in computerlesbarer Form im Zusammenhang mit Sequenzprotokollen *(Art und Anzahl der Datenträger)*
    - (i) ☐ Kopie ausschließlich für die Zwecke der internationalen Recherche nach Abschnitt 802(b-*quater*) (und nicht als Teil der internationalen Anmeldung) :
    - (ii) ☐ *(nur falls Felder (b)(ii) oder (c)(ii) in der linken Spalte angekreuzt wurden)* zusätzliche Kopien einschließlich, soweit zutreffend, einer Kopie für die Zwecke der internationalen Recherche nach Abschnitt 802(b-*quater*) :
    - (iii) ☐ zusammen mit entsprechender Erklärung, daß die Kopie(n) mit dem in der linken Spalte aufgeführten Tabellen identisch ist (sind) :
11. ☐ Sonstige *(einzeln aufführen)*: ..... :

Abbildung der Zeichnungen, die mit der Zusammenfassung veröffentlicht werden soll (Nr.): 1

Sprache, in der die internationale Anmeldung eingereicht wird: Deutsch

Feld Nr. X UNTERSCHRIFT DES ANMELDERS, DES ANWALTS ODER DES GEMEINSAMEN VERTRETERS

Der Name jeder unterzeichnenden Person ist neben der Unterschrift zu wiederholen, und es ist anzugeben, sofern sich dies nicht eindeutig aus dem Antrag ergibt, in welcher Eigenschaft die Person unterzeichnet.

München, den 01.08.2003

Martin Aufenanger

Vom Anmeldeamt auszufüllen

1. Datum des tatsächlichen Eingangs dieser internationalen Anmeldung: 01 AUG 2003 (01.08.03)

2. Zeichnungen:
   - ☒ eingegangen:
   - ☐ nicht eingegangen:

3. Geändertes Eingangsdatum aufgrund nachträglich, jedoch fristgerecht eingegangener Unterlagen oder Zeichnungen zur Vervollständigung dieser internationalen Anmeldung:

4. Datum des fristgerechten Eingangs der angeforderten Richtigstellungen nach Artikel 11(2) PCT:

5. Internationale Recherchenbehörde *(falls zwei oder mehr zuständig sind)*: ISA /

6. ☐ Übermittlung des Recherchenexemplars bis zur Zahlung der Recherchengebühr aufgeschoben

Vom Internationalen Büro auszufüllen

Datum des Eingangs des Aktenexemplars beim Internationalen Büro:

Der Antrag ist bei der zuständigen mit der internationalen vorläufigen Prüfung beauftragten Behörde oder, wenn zwei oder mehr Behörden zuständig sind, bei der vom Anmelder gewählten Behörde einzureichen. Der Anmelder kann den Namen oder den Zweibuchstaben-Code der Behörde auf der nachstehenden Zeile angeben.

IPEA/ Europäisches Patentamt

PCT

KAPITEL II

ANTRAG AUF INTERNATIONALE VORLÄUFIGE PRÜFUNG

nach Artikel 31 des Vertrags über die internationale Zusammenarbeit auf dem Gebiet des Patentwesens:
Der (die) Unterzeichnete(n) beantragt (beantragen), daß für die nachstehend bezeichnete internationale Anmeldung die internationale vorläufige Prüfung nach dem Vertrag über die internationale Zusammenarbeit auf dem Gebiet des Patentwesens durchgeführt wird und benennt hiermit als ausgewählte Staaten alle auswählbaren Staaten (soweit nichts anderes angegeben).

Von der mit der internationalen vorläufigen Prüfung beauftragten Behörde auszufüllen

Bezeichnung der IPEA	Eingangsdatum des ANTRAGS

Feld Nr. I KENNZEICHNUNG DER INTERNATIONALEN ANMELDUNG

Aktenzeichen des Anmelders oder Anwalts: PCT1904MA014gi

Internationales Aktenzeichen	Internationales Anmeldedatum *(Tag/Monat/Jahr)*	(Frühester) Prioritätstag *(Tag/Monat/Jahr)*
PCT/EP03/08550	01/08/2003 01. August 2003	11/09/2002 ✓ 11. September 2002

Bezeichnung der Erfindung: Hochdynamische Servo-Ventilsteuervorrichtung

Feld Nr. II ANMELDER

Name und Anschrift: *(Familienname, Vorname; bei juristischen Personen vollständige amtliche Bezeichnung. Bei der Anschrift sind die Postleitzahl und der Name des Staats anzugeben.)*

Moog GmbH
Hanns-Klemm-Str. 28
71034 Boeblingen
DE

Telefonnr.:
Telefaxnr.:
Fernschreibnr.:
Registrierungsnr. des Anmelders beim Amt:

Staatsangehörigkeit (Staat):	Sitz oder Wohnsitz (Staat):
DE	DE

Name und Anschrift: *(Familienname, Vorname; bei juristischen Personen vollständige amtliche Bezeichnung. Bei der Anschrift sind die Postleitzahl und der Name des Staats anzugeben.)*

MURRENHOFF, Hubertus
Wildbachstr. 59
52075 Aachen
DE

Staatsangehörigkeit (Staat):	Sitz oder Wohnsitz (Staat):
DE	DE

Name und Anschrift: *(Familienname, Vorname; bei juristischen Personen vollständige amtliche Bezeichnung. Bei der Anschrift sind die Postleitzahl und der Name des Staats anzugeben.)*

BOES, Christoph
Schönbuchstr. 5
71154 Nufringen
DE

Staatsangehörigkeit (Staat):	Sitz oder Wohnsitz (Staat):
DE	DE

☐ Weitere Anmelder sind auf einem Fortsetzungsblatt angegeben.

Internationales Aktenzeichen
PCT/EP03/08550

Feld Nr. III ANWALT ODER GEMEINSAMER VERTRETER; ODER ZUSTELLANSCHRIFT

Die folgende Person ist ☒ Anwalt ☐ gemeinsamer Vertreter

und ☒ ist vom (von den) Anmelder(n) bereits früher bestellt worden und vertritt ihn (sie) auch für die internationale vorläufige Prüfung.

☐ wird hiermit bestellt; eine etwaige frühere Bestellung eines Anwalts/gemeinsamen Vertreters wird hiermit widerrufen.

☐ wird hiermit zusätzlich zu dem bereits früher bestellten Anwalt/gemeinsamen Vertreter, nur für das Verfahren vor der mit der internationalen vorläufigen Prüfung beauftragten Behörde bestellt.

Name und Anschrift: *(Familienname, Vorname; bei juristischen Personen vollständige amtliche Bezeichnung. Bei der Anschrift sind die Postleitzahl und der Name des Staats anzugeben.)*

AUFENANGER, Martin
Grünecker, Kinkeldey, Stockmair & Schwanhäusser
Anwaltssozietät
Maximilianstraße 58
80538 München
Germany

Telefonnr.: +49 89 212350

Telefaxnr.: +49 89 220287

Fernschreibnr.:

Registrierungsnr. des Anwalts beim Amt: 72 EPA

☐ **Zustellanschrift:** Dieses Kästchen ist anzukreuzen, wenn kein Anwalt oder gemeinsamer Vertreter bestellt ist und statt dessen im obigen Feld eine spezielle Zustellanschrift angegeben wird.

Feld Nr. IV GRUNDLAGE DER INTERNATIONALEN VORLÄUFIGEN PRÜFUNG

Erklärung betreffend Änderungen:*

1. Der Anmelder wünscht, daß die internationale vorläufige Prüfung auf der Grundlage
   ☐ der internationalen Anmeldung in der ursprünglich eingereichten Fassung
   der Beschreibung ☒ in der ursprünglich eingereichten Fassung
   ☐ unter Berücksichtigung der Änderungen nach Artikel 34
   der Patentansprüche ☐ in der ursprünglich eingereichten Fassung
   ☒ unter Berücksichtigung der Änderungen nach Artikel 19 (ggf. zusammen mit einer Erklärung)
   ☐ unter Berücksichtigung der Änderungen nach Artikel 34
   der Zeichnungen ☒ in der ursprünglich eingereichten Fassung
   ☐ unter Berücksichtigung der Änderungen nach Artikel 34
   aufgenommen wird.
2. ☐ Der Anmelder wünscht, daß jegliche nach Artikel 19 eingereichte Änderung der Ansprüche als überholt angesehen wird.
3. ☐ Der Anmelder wünscht, daß der Beginn der internationalen vorläufigen Prüfung bis zum Ablauf der nach Regel 69.1 Absatz d maßgeblichen Frist **aufgeschoben wird.**
4. ☐ Der Anmelder wünscht ausdrücklich, daß die internationale vorläufige Prüfung bereits vor Ablauf der nach Regel 54*bis*.1 Absatz a maßgeblichen Frist beginnt.

* Wenn kein Kästchen angekreuzt wird, wird mit der internationalen vorläufigen Prüfung auf der Grundlage der internationalen Anmeldung in der ursprünglich eingereichten Fassung begonnen; wenn eine Kopie der Änderungen der Ansprüche nach Artikel 19 und/oder Änderungen der internationalen Anmeldung nach Artikel 34 bei der mit der internationalen vorläufigen Prüfung beauftragten Behörde eingeht, bevor diese mit der Erstellung eines schriftlichen Bescheids oder des internationalen vorläufigen Prüfungsberichts begonnen hat, wird jedoch die geänderte Fassung verwendet.

Sprache für die Zwecke der internationalen vorläufigen Prüfung: Deutsch ;

☒ dies ist die Sprache, in der die internationale Anmeldung eingereicht wurde.
☐ dies ist die Sprache der Übersetzung, die für die Zwecke der internationalen Recherche eingereicht wurde.
☐ dies ist die Sprache der Veröffentlichung der internationalen Anmeldung.
☐ dies ist die Sprache der Übersetzung, die für die Zwecke der internationalen vorläufigen Prüfung eingereicht wurde/wird.

Feld Nr. V BENENNUNG VON STAATEN ALS AUSGEWÄHLTE STAATEN

Die Einreichung dieses Antrags umfaßt die Auswahl aller Vertragsstaaten, die bestimmt wurden und durch Kapitel II des PCT gebunden sind.

Siehe Anmerkungen zu diesem Antragsformular

Aktenzeichen des Anwalts: PCT1904MA014gl

Internationales Aktenzeichen
PCT/EP03/08550

Feld Nr. VI KONTROLLISTE

Dem Antrag liegen folgende Unterlagen für die Zwecke der internationalen vorläufigen Prüfung in der in Feld Nr. IV angegebenen Sprache bei:			Von der mit der internationalen vorläufigen Prüfung beauftragten Behörde auszufüllen: erhalten	nicht erhalten
1. Übersetzung der internationalen Anmeldung	:	Blätter	☐	☐
2. Änderungen nach Artikel 34	:	Blätter	☐	☐
3. Kopie (oder, falls erforderlich, Übersetzung) der Änderungen nach Artikel 19	:	2 Blätter	☐	☐
4. Kopie (oder, falls erforderlich, Übersetzung) einer Erklärung nach Artikel 19	:	Blätter	☐	☐
5. Begleitschreiben	:	Blätter	☐	☐
6. Sonstige *(einzeln aufführen)*	:	Blätter	☐	☐

Dem Antrag liegen außerdem die nachstehend angekreuzten Unterlagen bei:

1. ☒ Blatt für die Gebührenberechnung
2. ☐ Original einer gesonderten Vollmacht
3. ☐ Original einer allgemeinen Vollmacht
4. ☐ Kopie der allgemeinen Vollmacht; Aktenzeichen (falls vorhanden):
5. ☐ Begründung für das Fehlen einer Unterschrift
6. ☐ Sequenzprotokoll in computerlesbarer Form
7. ☐ Tabellen in computerlesbarer Form im Zusammenhang mit einem Sequenzprotokoll
8. ☒ sonstige *(einzeln aufführen)*: Zusatzblatt

Feld Nr. VII UNTERSCHRIFT DES ANMELDERS, ANWALTS ODER GEMEINSAMEN VERTRETERS

Der Name jeder unterzeichnenden Person ist neben der Unterschrift zu wiederholen, und es ist anzugeben, sofern sich dies nicht aus dem Antrag ergibt, in welcher Eigenschaft die Person unterzeichnet.

München, 24.03.2004

Martin Autenanger

Von der mit der internationalen vorläufigen Prüfung beauftragten Behörde auszufüllen

1. Datum des tatsächlichen Eingangs des ANTRAGS:

2. Geändertes Eingangsdatum des Antrags aufgrund von BERICHTIGUNGEN nach Regel 60.1 Absatz b:

3. ☐ Das Eingangsdatum des Antrags liegt NACH Ablauf von 19 Monaten ab Prioritätsdatum; Punkte 4 und 5, unten, finden keine Anwendung.
   ☐ Der Anmelder wurde entsprechend unterrichtet.
4. ☐ Das Eingangsdatum des Antrags liegt wegen Fristverlängerung nach Regel 80.5 INNERHALB von 19 Monaten ab Prioritätsdatum.
5. ☐ Das Eingangsdatum des Antrags liegt nach Ablauf von 19 Monaten ab Prioritätsdatum, der verspätete Eingang ist aber nach Regel 82 ENTSCHULDIGT.
6. ☐ Das Eingangsdatum des Antrags liegt NACH Ablauf der nach Regel 54*bis*.1 Absatz a vorgeschriebenen Frist; Punkte 7 und 8, unten, finden keine Anwendung.
7. ☐ Das Eingangsdatum des Antrags liegt wegen Fristverlängerung nach Regel 80.5 INNERHALB der nach Regel 54*bis*.1 Absatz a vorgeschriebenen Frist.
8. ☐ Das Eingangsdatum des Antrags liegt nach Ablauf der nach Regel 54*bis*.1 Absatz a vorgeschriebenen Frist, der verspätete Eingang ist aber nach Regel 82 ENTSCHULDIGT.

Vom Internationalen Büro auszufüllen

Antrag vom IPEA erhalten am:

Aktenzeichen des Anwalts: PCT1904MA014gi

Zusatzblatt

Internationales Aktenzeichen: PCT/EP03/08550

Es wird nachdrücklich s u b s t a n t i e l l e internationale Prüfung mit Ausgabe eines schriftlichen Bescheides beantragt.

München, 24.03.2004

Martin Aufenanger

VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS

Absender: MIT DER INTERNATIONALEN VORLÄUFIGEN PRÜFUNG BEAUFTRAGTE BEHÖRDE

An:

AUFENANGER, Martin
GRÜNECKER, KINKELDEY, STOCKMAIR
& SCHWANHÄUSSER
Maximilianstrasse 58
D-80538 München
ALLEMAGNE

GRÜNECKER, KINKELDEY, STOCKMAIR & SCHWANHÄUSSER ANWALTSSOZIETÄT
14. Mai 2004
FRIST 13.8.04 EINGANG

PCT

SCHRIFTLICHER BESCHEID (Regel 66 PCT)

Absendedatum (Tag/Monat/Jahr)	13.05.2004
Aktenzeichen des Anmelders oder Anwalts: PCT 1904MA014gi	**ANTWORT FÄLLIG** **innerhalb von 3 Monat(en)** ab obigem Absendedatum

Internationales Aktenzeichen	Internationales Anmeldedatum (Tag/Monat/Jahr)	Prioritätsdatum (Tag/Monat/Jahr)
PCT/EP 03/08550	01.08.2003	11.09.2002

Internationale Patentklassifikation (IPK) oder nationale Klassifikation und IPK
F15B13/04, F15B13/04

Anmelder
MOOG GMBH et al.

1. Dieser Bescheid ist der **erste** schriftliche Bescheid der mit der internationalen vorläufigen Prüfung beauftragten Behörde.

2. Dieser Bescheid enthält Angaben zu folgenden Punkten:

I	☒	Grundlage des Bescheids
II	☐	Priorität
III	☐	Keine Erstellung eines Gutachtens über Neuheit, erfinderische Tätigkeit und gewerbliche Anwendbarkeit
IV	☐	Mangelnde Einheitlichkeit der Erfindung
V	☒	Begründete Feststellung nach Regel 66.2 a)ii) hinsichtlich der Neuheit, der erfinderischen Tätigkeit und der gewerblichen Anwendbarkeit; Unterlagen und Erklärungen zur Stützung dieser Feststellung
VI	☐	Bestimmte angeführte Unterlagen
VII	☐	Bestimmte Mängel der internationalen Anmeldung
VIII	☐	Bestimmte Bemerkungen zur internationalen Anmeldung

3. Der Anmelder wird **aufgefordert**, zu diesem Bescheid **Stellung zu nehmen**.

Wann? Siehe oben genannte Frist. Der Anmelder kann vor Ablauf dieser Frist bei der Behörde eine Verlängerung beantragen, siehe Regel 66.2 d).

Wie? Durch Einreichung einer schriftlichen Stellungnahme und gegebenenfalls von Änderungen nach Regel 66.3. Zu Form und Sprache der Änderungen, siehe Regeln 66.8 und 66.9.

Dazu: Hinsichtlich einer zusätzlichen Möglichkeit zur Einreichung von Änderungen, siehe Regel 66.4.
Hinsichtlich der Verpflichtung des Prüfers, Änderungen und/oder Gegenvorstellungen zu berücksichtigen, siehe Regel 66.4 bis.
Hinsichtlich einer formlosen Eröterung mit dem Prüfer, siehe Regel 66.6.

Wird keine Stellungnahme eingereicht, so wird der internationale vorläufige Prüfungsbericht auf der Grundlage dieses Bescheides erstellt.

4. Der Tag, an dem der internationale vorläufige Prüfungsbericht gemäß Regel 69.2 spätestens erstellt sein muß, ist der: 11.01.2005

Name und Postanschrift der mit der internationalen Prüfung beauftragten Behörde

Europäisches Patentamt
D-80298 München
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Fax: +49 89 2399 - 4465

Bevollmächtigter Bediensteter
Sbaihi, M

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Stafl, C
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SCHRIFTLICHER BESCHEID

Internationales Aktenzeichen PCT/EP 03/08550

I. Grundlage des Bescheids

1. Hinsichtlich der **Bestandteile** der internationalen Anmeldung *(Ersatzblätter, die dem Anmeldeamt auf eine Aufforderung nach Artikel 14 hin vorgelegt wurden, gelten im Rahmen dieses Bescheids als "ursprünglich eingereicht")*:

Beschreibung, Seiten

1-6	in der ursprünglich eingereichten Fassung

Ansprüche, Nr.

1-10	eingereicht mit dem Antrag

Zeichnungen, Blätter

1/1	in der ursprünglich eingereichten Fassung

2. Hinsichtlich der **Sprache**: Alle vorstehend genannten Bestandteile standen der Behörde in der Sprache, in der die internationale Anmeldung eingereicht worden ist, zur Verfügung oder wurden in dieser eingereicht, sofern unter diesem Punkt nichts anderes angegeben ist.

   Die Bestandteile standen der Behörde in der Sprache: zur Verfügung bzw. wurden in dieser Sprache eingereicht; dabei handelt es sich um

   ☐ die Sprache der Übersetzung, die für die Zwecke der internationalen Recherche eingereicht worden ist (nach Regel 23.1(b)).
   ☐ die Veröffentlichungssprache der internationalen Anmeldung (nach Regel 48.3(b)).
   ☐ die Sprache der Übersetzung, die für die Zwecke der internationalen vorläufigen Prüfung eingereicht worden ist (nach Regel 55.2 und/oder 55.3).

3. Hinsichtlich der in der internationalen Anmeldung offenbarten **Nucleotid- und/oder Aminosäuresequenz** ist die internationale vorläufige Prüfung auf der Grundlage des Sequenzprotokolls durchgeführt worden, das:

   ☐ in der internationalen Anmeldung in schriftlicher Form enthalten ist.
   ☐ zusammen mit der internationalen Anmeldung in computerlesbarer Form eingereicht worden ist.
   ☐ bei der Behörde nachträglich in schriftlicher Form eingereicht worden ist.
   ☐ bei der Behörde nachträglich in computerlesbarer Form eingereicht worden ist.
   ☐ Die Erklärung, daß das nachträglich eingereichte schriftliche Sequenzprotokoll nicht über den Offenbarungsgehalt der internationalen Anmeldung im Anmeldezeitpunkt hinausgeht, wurde vorgelegt.
   ☐ Die Erklärung, daß die in computerlesbarer Form erfassten Informationen dem schriftlichen Sequenzprotokoll entsprechen, wurde vorgelegt.

4. Aufgrund der Änderungen sind folgende Unterlagen fortgefallen:

   ☐ Beschreibung, Seiten:
   ☐ Ansprüche, Nr.:
   ☐ Zeichnungen, Blatt:

5. ☐ Dieser Bescheid ist ohne Berücksichtigung (von einigen) der Änderungen erstellt worden, da diese aus den angegebenen Gründen nach Auffassung der Behörde über den Offenbarungsgehalt in der ursprünglich eingereichten Fassung hinausgehen (Regel 70.2(c)).

6. Etwaige zusätzliche Bemerkungen:

V. Begründete Feststellung nach Regel 66.2(a)(ii) hinsichtlich der Neuheit, der erfinderischen Tätigkeit und der gewerblichen Anwendbarkeit; Unterlagen und Erklärungen zur Stützung dieser Feststellung

1. Feststellung

Neuheit (N)	Ansprüche	1
Erfinderische Tätigkeit (IS)	Ansprüche	
Gewerbliche Anwendbarkeit (IA)	Ansprüche	

2. Unterlagen und Erklärungen:

siehe Beiblatt

Zu Punkt V

Begründete Feststellung nach Regel 66.2(a)(ii) hinsichtlich der Neuheit, der erfinderischen Tätigkeit und der gewerblichen Anwendbarkeit; Unterlagen und Erklärungen zur Stützung dieser Feststellung

1) Anspruch 1

Durch den Ausdruck "die Servosteuervorrichtung eine Primärantriebseinrichtung **und/oder** eine Hochfrequenzeinrichtung umfaßt" scheint der Gegenstand des Anspruchs 1 drei alternative Möglichkeiten zu beanspruchen:

a) eine Servosteuervorrichtung, die eine Primärantriebseinrichtung umfaßt;
b) eine Servosteuervorrichtung, die eine Hochfrequenzeinrichtung umfaßt;
c) eine Servosteuervorrichtung, die eine Primärantriebseinrichtung **und** eine Hochfrequenzeinrichtung umfaßt;

Da der Gegenstand des Anspruch noch weitere wesentlichen Merkmale für beide Einrichtungen (Primärantriebseinrichtung und Hochfrequenzeinrichtung) enthält, sind die Alternative a) und b) unklar.

Der Anspruch ist somit nicht klar und erfüllt die Erfordernisse des Artikels 6 PCT insofern nicht, als der Gegenstand des Schutzbegehrens nicht klar definiert ist.

Sollte eine der beiden Einrichtungen allein (Alternativ a) oder b)) beansprucht werden, wäre der Gegenstand des Anspruchs 1 nicht neu gemäß Art.33(2) PCT, da die weitere Merkmale der entsprechenden Alternativen aus D2 (EP-A-1098101) für die Alternativ a) und aus D1 (GB677672) für die Alternativ b) bekannt sind.
Die Alternativ c) mit beiden Einrichtungen scheint gemäß Art. 33(2) neu zu sein, da keine der Entgegenhaltungen solch eine Kombination offenbart noch naheliegt.

Die Abhängigkeit von Anspruch 3 in Bezug auf Anspruch 1 ist nicht klar und wird nicht den Anforderungen von PCT der Regel 6.4(b) gerecht, insofern als die Hülsenpositionsbestimmungseinrichtung , für die ein Schutz gesucht wird, nicht als Gegenstand des Anspruchs 1 definiert ist.

Die Ansprüche 6 und 7 sind nicht klar, für die Alternativ c) des Anspruchs 1 (Artikel 6 PCT).

2) Weiteres Verfahren

Dem Anmelder wird die Einreichung neuer Ansprüche anheimgestellt, die den vorstehenden Bemerkungen Rechnung tragen.

Die Beschreibung soll, wie in Regel 5.1 a) iii) PCT vorgeschrieben, in Einklang mit den Ansprüchen stehen.

Um die Erfordernisse der Regel 5.1a)ii PCT zu erfüllen, ist in der Beschreibung das Dokument D2 zu nennen; sein einschlägiger Inhalt sollte kurz umrissen werden. Der Anmelder sollte in der Beschreibung klar zum Ausdruck bringen, welche Merkmale des Gegenstandes des neuen unabhängigen Anspruchs aus Dokument D2 schon bekannt sind.

Der Anmelder wird gebeten, die Änderungen auf Austauschseiten wie in Regel 66.8 a) PCT vorgeschrieben einzureichen. Insbesondere sollten Reinschriften der Änderungen in dreifacher Ausfertigung eingereicht werden.

WO 2004/033921
PCT/EP2003/008

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTICE INFORMING THE APPLICANT OF THE COMMUNICATION OF THE INTERNATIONAL APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

To:

AUFENANGER, Martin
Grünecker, Kinkeldey, Stockmair & Schwanhäusser
Maximilianstrasse 58
80538 München
ALLEMAGNE

Date of mailing *(day/month/year)* 22 April 2004 (22.04.2004)	
Applicant's or agent's file reference PCT 1904-114	**IMPORTANT NOTICE**
International application No. PCT/EP2003/008550	International filing date *(day/month/year)* 01 August 2003 (01.08.2003)
Priority date *(day/month/year)* 11 September 2002 (11.09.2002)	
Applicant MOOG GMBH et al	

1. Notice is hereby given that the International Bureau has **communicated**, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this notice:

   AU, AZ, BY, CH, CN, CO, DZ, EP, HU, JP, KG, KP, KR, MD, MK, MZ, RU, TM, US

   In accordance with Rule 47.1(c), third sentence, those Offices will accept the present notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:

   AE, AG, AL, AM, AP, AT, BA, BB, BG, BR, BZ, CA, CR, CU, CZ, DE, DK, DM, EA, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, ID, IL, IN, IS, KE, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MG, MN, MW, MX, NI, NO, NZ, OA, OM, PG, PH, PL, PT, RO, SC, SD, SE, SG, SK, SL, SY, TJ, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW

   The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-*bis*)).

3. Enclosed with this notice is a copy of the international application as published by the International Bureau on 22 April 2004 (22.04.2004) under No. WO 2004/033921

4. **TIME LIMITS for filing a demand for international preliminary examination and for entry into the national phase**

   The applicable time limit for entering the national phase will, **subject to what is said in the following paragraph,** be **30 MONTHS** from the priority date, not only in respect of any elected Office if a demand for international preliminary examination is filed before the expiration of **19 months** from the priority date, but also in respect of any designated Office, in the absence of filing of such demand, where Article 22(1) as modified with effect from 1 April 2002 applies in respect of that designated Office. For further details, see *PCT Gazette* No. 44/2001 of 1 November 2001, pages 19926, 19932 and 19934, as well as the *PCT Newsletter*, October and November 2001 and February 2002 issues.

   In practice, **time limits other than the 30-month time limit** will continue to apply, for various periods of time, in respect of certain designated or elected Offices. For **regular updates on the applicable time limits** (20, 21, 30 or 31 months, or other time limit), Office by Office, refer to the *PCT Gazette*, the *PCT Newsletter* and the *PCT Applicant's Guide*, Volume II, National Chapters, all available from WIPO's Internet site, at http://www.wipo.int/pct/en/index.html.

   For filing a **demand for international preliminary examination**, see the *PCT Applicant's Guide*, Volume I/A, Chapter IX. Only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination (at present, all PCT Contracting States are bound by Chapter II).

   It is the applicant's **sole responsibility** to monitor all these time limits.

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.+41 22 740 14 35

Authorized officer
Agnes Wittmann-Regis

Telephone No.+41 22 338 83 38

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 03/08550

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 F15B13/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 F15B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 677 672 A (GEN MOTORS CORP) 20 August 1952 (1952-08-20) page 1, line 87 -page 2, line 108; figure 1	1,6,7
X	EP 1 098 101 A (GEN MOTORS CORP) 9 May 2001 (2001-05-09) paragraph '0026! - paragraph '0033!; figures	1,6,7
X	US 4 205 590 A (STEGNER JAMES C) 3 June 1980 (1980-06-03) column 6, line 33 -column 8, line 68; figures 4,5	1,6,7

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
22 October 2003	04/11/2003

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Sbaihi, M

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 03/08550

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 333 387 A (SEITZ CLYDE R) 8 June 1982 (1982-06-08)	1
A	column 4, line 43 -column 6, line 18; figures -----	2

INTERNATIONAL SEARCH REPORT

Information on patent family members

Internat[illegible] Application No
PCT/EP 03/08550

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
GB 677672	A	20-08-1952	NONE		
EP 1098101	A	09-05-2001	US	6179107 B1	30-01-2001
			EP	1098101 A2	09-05-2001
			JP	2001187960 A	10-07-2001
US 4205590	A	03-06-1980	DE	2900754 A1	09-08-1979
			GB	2013938 A ,B	15-08-1979
			JP	1463023 C	28-10-1988
			JP	54148984 A	21-11-1979
			JP	62061801 B	23-12-1987
US 4333387	A	08-06-1982	NONE		

INVENTOR: [illegible]renhoff (Moog)
SERIAL NO.: [illegible]/527,204
FILED: March 10, 2005
TITLE: VALVE WITH INCREASED DYNAMIC RESPONSE

Status inquiry letter

AMENDMENT IN ABOVE APPLICATION HAS BEEN RECEIVED.

PATENT OFFICE
MAIL ROOM STAMP

Phillips Lytle LLP

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

July 29, 2005

Re: U.S. Patent Application Serial No. 10/527,204; filed 03/10/05; for VALVE WITH INCREASED DYNAMIC RESPONSE (Our Ref: MD-290)

Gentlemen:

Applicant respectfully inquires as to the status of the subject application.

This application was filed on March 10, 2005 and given Serial No. 10/527,204 (copy enclosed). To date we have not received the official Filing Receipt and the Notice to File Missing Parts.

Accordingly, applicant would inquire as to the status of the subject application.

Very truly yours,

PHILLIPS LYTLE LLP

By_____
Peter K. Sommer, Esq.
Reg. No. 26,587

PKS2pi
Enclosure
BFLO Doc. # 1501554.1

ATTORNEYS AT LAW

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BUFFALO ALBANY CHAUTAUQUA GARDEN CITY NEW YORK ROCHESTER WWW.PHILLIPSLYTLE.COM

INVENTOR: Gurrenhoff (Moog)
SERIAL NO.: 10/527,204
FILED: March 10, 2005
TITLE: VALVE WITH INCREASED DYNAMIC RESPONSE

2nd status inquiry letter

AMENDMENT IN ABOVE APPLICATION HAS BEEN RECEIVED.

PATENT OFFICE
MAIL ROOM STAMP

Phillips Lytle LLP

2nd Status Inquiry Request November 2, 2005

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Re: U.S. Patent Application Serial No. 10/527,204; filed 03/10/05; for VALVE WITH INCREASED DYNAMIC RESPONSE (Our Ref: MD-290)

Gentlemen:

Enclosed is a copy of our first status inquiry letter dated July 29, 2005.

Applicant respectfully inquires as to the status of the subject application.

This application was filed on March 10, 2005 and given Serial No. 10/527,204 (copy enclosed). To date we have not received the official Filing Receipt and the Notice to File Missing Parts.

Accordingly, applicant would inquire as to the status of the subject application.

Very truly yours,

PHILLIPS LYTLE LLP

By_____
Peter K. Sommer, Esq.
Reg. No. 26,587

PKS2pi
Enclosure
BFLO Doc. # 1501554.2

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INVENTOR: Mueewnhoff (moog)
SERIAL NO.: 10527,204
FILED: March 10, 2005
TITLE: VALVE WITH INCREASED DYNAMIC RESPONSE

3rd Status Inquiry Letter

AMENDMENT IN ABOVE APPLICATION HAS BEEN RECEIVED

PATENT OFFICE
MAIL ROOM STAMP

Phillips Lytle LLP

3rd Status Inquiry Request May 10, 2006

Mail Stop (OPIE)
Office of Initial Examination
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Re: U.S. Patent Application Serial No. 10/527,204; filed 03/10/05; for VALVE WITH INCREASED DYNAMIC RESPONSE (Our Ref: MD-290)

Gentlemen:

Enclosed are copies our 1st and 2nd status inquiry letters dated July 29, 2005 and November 2, 2005.

Applicant respectfully inquires as to the status of the subject application.

This application was filed on March 10, 2005 and given Serial No. 10/527,204 (copy enclosed). To date we have not received the official Filing Receipt and the Notice to File Missing Parts.

Accordingly, applicant would inquire as to the status of thesubject application.

If we do not receive a response within 30 days, we will have not option to file a Petition to reconstruct this file with the enclosed documents

Very truly yours,

PHILLIPS LYTLE LLP

By _____
Peter K. Sommer, Esq.
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PKS2pi
Enclosure
BFLO Doc. # 1501554.3

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